NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 4, NUMBER 46 NOVEMBER 16, 1987

▶ *WORLDWIDE NETWORKING*

AT&T plans $6b global net upgrade

Spending to center on digital systems.

BY BOB WALLACE
Senior Editor

BEDMINSTER, N.J. — AT&T said last week it will spend up to $6 billion during the next two years to upgrade its worldwide network with new digital switching and transmission facilities, $1 billion more than it estimated in January.

Although AT&T Chief Executive Officer James Olson said the decision to invest more in the network was driven by a projected 20% annual increase in demand for domestic and international calling services, analysts said the move may have been spurred by competitors who are offering digital fiber-optic services.

As part of its expansion plan, AT&T will increase the size of its domestic digital network from its current 45,000 route miles to 60,000 route miles by 1989 and 67,000 route miles by 1990. The company also said it will increase the total number of 4ESS and 5ESS digital central office switches in its network from the 126 used now to 151 by 1990. AT&T refused, however, to say what percentage of its total network is digital.

Bill Reed, director of Electronic Communications Services for Link Resources Corp., a New York-based communications research and consulting group, said the move is necessary if AT&T is to ward off its competitors both in the U.S. and abroad.

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▶ *INDUSTRY ALLIANCE*

Unisys acquires Timeplex

Purchase puts company in position to challenge Big Blue.

BY PAUL KORZENIOWSKI
Senior Editor

BLUE BELL, Pa. — Unisys Corp. last week announced its intention to purchase Timeplex, Inc. for roughly $350 million, a bold move designed to enable the mainframe maker to offer custom network products and services that compete head-to-head with those of IBM.

Unisys, the company formed by the 1986 merger of Burroughs Corp. and Sperry Corp., will use Timeplex as the cornerstone of a plan to compete with IBM and its Enterprise Marketing Program, which is driven by an elite sales team that represents IBM and its Rolm Corp. division to IBM's largest accounts.

The acquisition of Timeplex, the largest manufacturer of T-1 multiplexers, complements Unisys' stated intention

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Unisys buys Timeplex in enterprise network bid

Unisys Corp.,	Blue Bell, Pa.
1987 revenues:	$10 billion
Employees:	93,000
Principal line of business:	Mainframe computer systems
Customer base:	60,000, mostly within government and financial market sectors
Timeplex, Inc.,	Woodcliff Lake, N.J.
New name:	Unisys Networks
1987 revenues:	$150 million
Employees:	1,600
Principal line of business:	Communications equipment, primarily T-1 multiplexers
Customer base:	2,600, in a range of businesses

NETWORK WORLD CHART

▶ *ANALYSIS*

LAN factions split on OS/2

BY MARY PETROSKY
West Coast Correspondent

Differences in the way IBM and Microsoft Corp. handle communications among applications within OS/2-based local networks could hinder development of advanced network applications by forcing software developers to choose which method to support.

Microsoft and IBM worked closely to develop OS/2, a multitasking operating system for Intel Corp. 80286 and 80386 microprocessor-based personal computers, including IBM Personal System/2s. Both companies also developed OS/2-based local networking products, although IBM has taken a broader approach to personal computer connectivity with the new

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SPECIAL SECTION

Kaminski on MAP: 'Nothing sits still'

Conversing with GM's guru.

Mike Kaminski joined General Motors Corp. in 1969 with a bachelor's degree in industrial management, a master's in business administration and a background in corporate finance and computer programming. He began work in GM's manufacturing and process control systems group. In 1979, he and several others formed a group within the company to improve GM's factory automation and communications. The group's plans for factory automation evolved into the Manufacturing Automation Protocol.

Since then, MAP has grown considerably beyond the confines of GM automotive plants. Recognized as a subset of the International Standards Organization's

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NETWORK LINE

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▶ Previewing 1988 at a one-day strategy session, IBM confirms plans for new communications processors and tells attendees about its plans to become a one-stop source for communications products. Page 2.

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NEWSPAPER

▶ *NET MANAGEMENT*

Utility focuses on network control

Consolidation plan cuts costs.

BY PAUL KORZENIOWSKI
Senior Editor

SAN FRANCISCO — Pacific Gas and Electric Co. (PG&E) is attempting to thwart rising network management costs by consolidating a variety of functions into a central control center, which may serve as a model for other users.

The $8 billion company's sprawling private network connects branch offices and power plants located throughout 94,000 square miles in northern California. A total networking staff of 475 employees, including field personnel, supports the network, which includes 5,000 miles of microwave channels, 80 miles of fiber-optic cable

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▶ *BABY BELL PROTEST*

RBHCs appeal Greene's MFJ ruling

Aggrieved parties claim First Amendment rights abridged.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The seven regional Bell holding companies recently began court proceedings to overturn U.S. District Court Judge Harold Greene's order prohibiting them from entering the long-distance, equipment manufacturing and information service markets.

The RBHCs filed notices of appeal in U.S. District Court here to challenge Greene's September order, which upheld most of the Modified Final Judgment restrictions imposed on the RBHCs as conditions of the 1984 breakup of the Bell System.

The RBHCs were joined in their legal challenge by the U.S. Department of Justice, the California Public Utilities Commission and the District of Columbia Public Service Commission, which also filed notices of appeal.

The notices were filed on Nov. 5 and Nov. 6, which was the deadline for appealing Greene's ruling. The appeals will be heard by the U.S. Court of Appeals for the District of Columbia. Those appealing Greene's decision will be required to submit briefs with the court detailing their charges.

Attorneys for the RBHCs said they don't expect briefs to be filed until the first of the year and don't expect the case to be resolved before the end of 1988.

The RBHCs are awaiting Greene's final order concerning the information services ban. Greene told the RBHCs in September they could provide transmission services and information gateways for enhanced service providers, but they still cannot market "content-based" information services such as electronic directories.

Greene's final order should clarify several issues raised in his initial September order and should outline the specific information services the RBHCs can offer. Once that is done, the RBHCs will have a better idea of how to proceed with their legal challenge, said Pacific Telesis Group spokeswoman Mary Hallisey.

In September, Greene also upheld the bar on RBHC provision of long-distance telephone service and telecommunications equipment manufacturing. Greene removed the Modified Final Judgment restriction on RBHC participation in nontelecommunications businesses.

Bell Atlantic attorney John Goodman said his firm will challenge Greene's ban on RBHC provision of content-based information

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▶ *BIG BLUEPRINT*

IBM tips consultants on its 1988 strategy

Plans to be one-stop shopping source.

BY JIM BROWN
New Products Editor

BOSTON — Having assembled the pieces of its communications puzzle, IBM last week told a gathering of consultants how it will attempt to fit them together in 1988.

At a one-day strategy session here, high-level IBM and Rolm Corp. officials said IBM will leverage its existing telecommunications and computer equipment to position itself as a one-stop shopping source.

According to consultants, Ellen Hancock, president of IBM's Communication Products Division, confirmed IBM will announce a new front-end processor and a new version of its Network Control Program software next year. She declined further comment on the products. IBM is said to be working on a 3725 replacement and a high-end communications controller capable of off-loading communications tasks from the mainframe. ("IBM set to introduce two new front-end processors," *NW*, Nov. 2 and "Big Blue readying agile FEP," *NW*, Nov. 9).

Consultants also said they were told that Rolm will become a manufacturing and development division of IBM instead of an "IBM company" early next year.

Rolm President Ray AbuZayyad told the more than 100 consultants at the meeting that the organizational structure needed to solidify Rolm as an IBM division is mostly in place. IBM is currently revamping Rolm internal policies, including salary scales, to match IBM's, according to Ian Angus, president of Angus TeleManagement Group, Inc. in Toronto.

"IBM's Communication Products Division will set the strategy for all IBM's telecommunications efforts. It was pretty clearly stated that Rolm's future function will be to develop and manufacture products," Angus said.

Among the moves in making Rolm an IBM division will be the placing of all Rolm equipment installers and service technicians into IBM's service organization. The next step will likely be to organize IBM and Rolm sales further under an IBM banner.

By next year, IBM's sales force will likely include both data and voice specialists, as opposed to the current Enterprise Marketing Program, under which both IBM and Rolm sales representatives make joint sales calls, according to Kim Myhre, vice-president of communications research at Framingham, Mass.-based International Data Corp. Myhre also said IBM is likely to continue Rolm's relationship with current distributors, value-added resellers and regional Bell holding companies.

IBM also committed to providing links from its Systems Network Ar-

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COMMUNICATIONS MANAGER

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Rabbit Software enters the micro mart with a package that enables an IBM PC or PS/2 to emulate a terminal controller and support micros, ASCII terminals and 3270-type peripherals. **Page 27.**

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Network World wants to make its news coverage even better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Editor Bruce Hoard toll free at (800) 343-6474.

▶ *RETRENCHING*

Contel ASC revamps to hike sales

BY PAM POWERS
Senior Editor

ROCKVILLE, Md. — Contel Corp. last week said it will restructure its Contel ASC satellite and private network divisions in an effort to boost sluggish sales, a move that will contribute to an estimated $200 million write-down for the year.

As part of the restructuring plan, which is aimed at incorporating the recently acquired Equatorial Communications Corp. and two Communications Satellite Corp. divisions into Contel's existing operations, Contel also hopes to mitigate the effects of shrinking revenue from its satellite operations by establishing itself as a systems integrator.

That strategy involves the introduction of new networking services, such as a terrestrial T-1 service introduced last week, and continued liaisons with networking equipment vendors.

Contel will restructure its Contel ASC subsidiary into four operating divisions, organized around product line and customer type. Contel ASC, which markets private and hybrid network services over its national satellite network to large business customers, is a division of Contel Information Systems, one of three corporate divisions. The others include Federal Systems and regulated telephone operations.

The restructured Contel ASC will consist of the Information Networks Division, which operates Contel's national satellite and terrestrial network and offers services; the Data Networks Division, which will combine the operations of Equatorial's and COMSAT's very small aperture terminal satellite operations; the Government Networks Division; and the Inter-

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Washington Update

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — U.S. District Court Judge Harold Greene recently granted the regional Bell holding companies a waiver of the Modified Final Judgment rules to allow them to perform tandem switching as part of the Martin Marietta Corp. bid on the $4.5 billion Federal Telecommunications System 2000 (FTS 2000) contract.

Greene's Nov. 6 decision represents the culmination of a controversy raised by AT&T in July over whether the type of switching the RBHCs planned to provide under Martin Marietta's bid for the FTS 2000 contract constituted a violation of the Modified Final Judgment.

AT&T argued that RBHC tandem switching constituted an interexchange or long-distance service, which the RBHCs are prohibited from offering under the terms of the Bell System divestiture and the Modified Final Judgment.

By issuing a waiver of the decree, Greene reserved judgment on the legality of RBHC tandem switching, choosing instead a solution that will "foster competition with respect to this huge contract," as Greene wrote in his decision.

The waiver will allow the RBHCs to supply about 40% of the tandem switching required under Martin Marietta's bid. MCI Communications Corp., which is also a partner with Martin Marietta on this project, will supply the remaining switching services.

The waiver will not allow the RBHCs to offer long-distance transmission services to the marketplace, nor will it allow them to perform this type of tandem switching for any private network customer other than the federal government, according to Greene's order.

"This action should open the doors for the widest possible competition in the FTS bidding process, and it will ensure that the federal government receives the most efficient and economical service available, without at the same time undermining the foundations of the MFJ," Greene wrote.

Martin Marietta had argued before Greene that RBHC switching services were essential to its FTS 2000 bid. If the RBHCs were not allowed to provide such services, Martin Marietta would be unable to submit a bid that was competitive with AT&T's. Such a prospect would leave AT&T as the sole bidder on the project, Martin Marietta said.

Holmes named to FCC post

President Ronald Reagan recently nominated Bradley Holmes to serve on the Federal Communications Commission, filling the seat held by former FCC Chairman Mark Fowler, who resigned in April.

The 34-year-old Holmes is chief of the policy and rules division of the FCC Mass Media Bureau. He is a Republican.

Holmes joined the FCC in 1984 as legal assistant to current Chairman Dennis Patrick. Previously, he worked at the Washington, D.C. law firm of Skadden Arps Slate Meagher & Flom. A native of Massachusetts, Holmes earned his undergraduate degree at Dartmouth University and his law degree at Georgetown University.

Some Washington observers say Holmes could be in for a tough confirmation battle before the Democratic-controlled Senate. Holmes must receive Senate Commerce Committee approval before assuming the post.

Given the administration's recent trouble confirming political appointees, Holmes' nomination could become stalled, according to Washington observers.

It is unlikely the Senate will hold a confirmation hearing before the end of this year, although Reagan could name him to a recess appointment, in which position Holmes could serve until the end of next year or until a Senate confirmation hearing is conducted.

The nomination of Holmes leaves one additional FCC seat to be filled. The president must name someone to fill the seat of FCC Commissioner Mimi Weyforth Dawson, who will resign her post to become the deputy secretary of the Department of Transportation, pending Senate confirmation.

LOCAL NETWORKING

Few flock to LocalNet'87

3Com, Novell execs speak on effects of OS/2.

BY JOSH GONZE
Staff Writer

LOS ANGELES — A quiet LocalNet'87 conference held here last week attracted only 2,500 attendees and 75 vendors, but users stalking the exhibit floor defended its importance, and some key vendors used the show to clarify their networking strategies.

A spokeswoman for Conference Management Corp., which recently took over management of the LocalNet show, attributed the low attendance and paucity of product announcements, in part, to poor timing. The conference began less than two weeks after local network vendors staged a new products hoedown at Comdex/Fall '87 in Las Vegas ("Comdex: LAN wares steal show," *NW,* Nov. 9).

Users and analysts looking to see how the local networking market will respond to IBM's OS/2 microcomputer operating system took interest in keynote speeches from 3Com Corp. President and Chief Executive Officer William Krause and Novell, Inc. Vice-President of Marketing and Development Craig Burton.

According to Krause, running OS/2 on networked workstations while running an OS/2-based network operating system on the server will enable users to treat the server as a compute server — capable of processing jobs — and a print and file server.

In addition, the multitasking OS/2 will enable an application's data entry, reporting and data management functions to be run either on a stand-alone personal computer or across processors on a network, Krause said. "The beauty of OS/2 is that you can move applications from stand-alone to distributed mode," he said.

Krause said IBM's OS/2 networking software, OS/2 LAN Server, and 3Com's equivalent software, 3+open, will be identical from the physical layer through the session layer. However, 3+open will differ at higher layers by offering links to non-IBM computers, including the Apple Computer, Inc. Macintosh and Digital Equipment Corp. VAX, he said.

Novell's Burton did not provide as many details on his company's OS/2 plans but affirmed Novell will support OS/2 Extended Edition, a more advanced version of OS/2 scheduled for introduction in July.

OS/2 on users' minds

Most users attending the show said they looked forward to implementing OS/2 on their networks. "OS/2 is going to be very important to us because we need more and more memory for our applications," said Brian Separa, a communications engineer in TRW, Inc.'s Data Services Division. "If we can rewrite our applications to the point where they can run applications in the background, that will solve half our problems," he said.

The rub, according to Separa, is the price. "It's going to be hard to justify buying OS/2 for a whole department unless the price drops to that of DOS," Separa said. IBM's announced price for OS/2 Extended Edition 1.0 is $795.

Like many of the users on the show floor, Separa said he was attending to find a product to fulfill a highly specific need, in his case, test gear for Ethernet and token-ring local nets.

Robert Smith, group leader for facilities planning at General Dynamics Corp., said he was shopping for a local network that could exist in a heat- and fumes-plagued factory environment, support user-friendly software for nontechnical staff and be integrated into his coaxial cable backbone network.

Smith warned against overly elegant technical solutions, saying he expected to select a straightforward network design. "We just want to be able to paint parts in our factory. The network will be as simple as I can make it."

Local network vendors notably absent from the exhibit floor included Ungermann-Bass, Inc., Sytek, Inc. and Digital Equipment Corp. 3Com and Novell were present only as participants in a multivendor token-ring demonstration in the Texas Instruments, Inc. booth. The show, however, boasted a number of wiring and cable vendors, including C-COR Electronics, Inc. and Optical Cable Corp.

New products announced at the conference included Infotron Systems Corp.'s LAN Span, a bridge linking 802.3 Ethernet-type networks via synchronous circuits ranging in speed from 56K bit/sec to 2.048M bit/sec. Rad Network Devices Ltd., an Israel-based data communications equipment manufacturer, introduced an Ethernet router and bridge supporting T-1 and other links.

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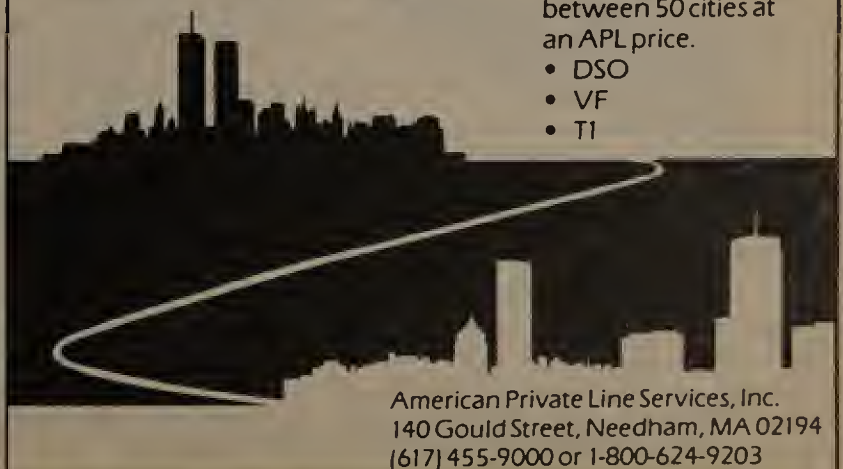

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FCC TARIFFS

AT&T, MCI file for new rates, features

BY PAM POWERS
Senior Editor

WASHINGTON, D.C. — AT&T filed a tariff with the Federal Communications Commission last week seeking higher rates for private lines and private-line installation fees, a move the company said would increase annual revenue by more than $73 million. Separately, MCI Communications Corp. announced enhancements to its Vnet virtual private network service.

AT&T's service rate hike affects the cost of interstate analog voice-grade leased lines that are 500 miles or shorter and installation charges for all voice-grade private lines.

The new AT&T rates would represent a 1.7% increase in private-line revenue for AT&T. "The rates are structured so the greatest percentage of increase is for the shortest circuits, which are the most costly to provide on a per-mile basis," AT&T reported. Percentage increase tapers downward as circuit length increases.

A 25-mile private line, for example, costs $116.99 monthly under the current tariff and would cost $132.20 under the pending rate, scheduled to go into effect Dec. 27, 1987. A 400-mile circuit now costs $420.24 and would cost $427.48 under the new schedule.

The tariff increases the one-time charge for connecting private lines to central office switches from $82.70 to $134.65.

MCI said Dial 1 access for its Vnet virtual private data and voice network will be available to customers Dec. 1. That capability will allow users to access MCI's virtual network services without using dedicated lines. MCI said the capability will be of primary benefit to users with a number of small locations, particularly those users who previously could not use Vnet because they could not justify the cost of installing dedicated lines to access the service.

The installation cost for Dial 1 access is $200 per location. MCI said charges for end-to-end usage will average 18 cents per minute for on-network calls and 22 cents per minute for off-network calls.

MCI said it will also introduce in December a Vnet card that will permit users to access Vnet from any domestic push-button phone by using an 800 number and an access code. Also in December, MCI will provide a 10-digit private dialing plan that will direct intracompany calls over fixed-cost dedicated terminating facilities.

SWITCHED 56 SERVICES

Nynex, INC sign accord

BY JIM BROWN
New Products Editor

NEW YORK — Nynex Enterprises announced a contract last week with Integrated Network Corp. (INC) for add-on equipment that would enable Nynex operating companies to implement switched 56K bit/sec services using existing network facilities.

Switched 56 service, which is only available in a few areas, enables users to establish 56K bit/sec digital data links on a dial-up basis, rather than leasing more expensive dedicated 56K bit/sec lines.

To provide the service, however, telephone companies are normally required to replace older switches with expensive new ones or to install adjunct central office network switches. Using line boards and software from Bridgewater, N.J.-based INC, Nynex will be able to upgrade its existing central office switches to support the service, the companies reported.

The contract was announced after a six-month field test of INC's Universal Switched Data Capability (USDC) ("Start-up's products set for first market trial," *NW*, June 1).

USDC line cards and software enable a central office switch to support 56K bit/sec data on a two-wire, dial-up telephone line. The products are said to be compatible with AT&T's 1AESS, 4AESS and 5AESS switches, as well as Northern Telecom, Inc.'s DMS-100.

Customers are required to use INC's Model 1056 Switched Data Service Unit, which combines the functions of a customer service unit and data service unit needed to access Switched 56 services.

Nynex will initially install the INC equipment in 20 of its New York Telephone Co. central offices in downstate New York. The equipment could be installed later in New England Telephone & Telegraph Co. central offices.

INC was formed in 1985 by a team consisting primarily of former senior AT&T Bell Laboratories employees.

AT&T plans $6b net upgrade

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"US Sprint and [the National Telecommunications Network] have had much success marketing digital fiber-optic-based services to large users," Reed said. "I assume AT&T is also trying to ward off MCI and Cable & Wireless [of North America] in the international market by improving and expanding their services outside the U.S."

Jack Kessler, president of Kessler Marketing Intelligence Corp., a Newport, R.I.-based communications research firm, said much of the network funds would be used to expand AT&T's network internationally. "Demand for international calling services has increased dramatically," he said, adding that carrier competition has intensified accordingly.

AT&T's domestic digital network expansion plan calls for the addition of 50 cities to the list of those currently served by the carrier's digital business services.

Olson said demand for these offerings has risen 20% annually. Asked why AT&T announced plans for increased spending amidst U.S. economic turmoil, he replied, "This is not the time for knee-jerk reactions that would get us in trouble."

Although ramping up digital network capacity, AT&T admitted its plans to offer Integrated Services Digital Network services are still in preliminary stages.

Frank Blount, president of AT&T Network Operations Group, predicted that it would take AT&T as long as a year and a half to two years to tariff an ISDN service using the Primary Rate Interface (PRI). PRI is a Consultative Committee on International Telephony and Telegraphy specification that delineates how large customer premises equipment, such as a private branch exchange, is connected to an ISDN network using a 1.544M bit/sec transmission link.

Blount said two users, one on the East Coast and one on the West Coast of the U.S., are beta-testing a PRI service for AT&T, but he would not release the names of the customers.

Internationally, AT&T claimed it would expand its digital network to 74,000 route miles in 1989 and to 88,000 by 1991, but the company would not provide figures on the current number of route miles it operates internationally.

Blount said TAT-8, an undersea fiber-optic cable linking the U.S. to the UK and France, will be in service in the second quarter of 1988. He also said a transpacific cable connecting the U.S. to Japan, the Philippines and Guam through Hawaii will be operational in late 1988 or early 1989.

To ensure uptime of new and existing facilities, AT&T will begin installing "restoration switches" near many major metropolitan areas next year.

These switches will augment redundant fiber-optic transmission facilities already encircling many major cities.

AT&T predicted that, by 1990, it will have equipped all of these backup switches with advanced software that will enable them to operate automatically in the case of line or switch outages. AT&T would not divulge the cost of this project.

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RBHC REGULATION

GAO assails FCC reporting rules

Cross-subsidy control at issue.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — In a recently released report, the Government Accounting Office (GAO) blasted the FCC's financial reporting rules governing RBHC business practices and accused the agency of devoting too few resources to policing the RBHCs.

The GAO report, entitled "Telephone Communications: Controlling Cross-Subsidy Between Regulated and Competitive Services," rebuked the Federal Communications Commission's Third Computer Inquiry financial reporting rules, which are designed to prevent the regional Bell holding companies from overcharging consumers or underpricing competitive services.

The report is the result of a year-long investigation by the GAO, which is an arm of the U.S. Congress, into the FCC's auditing and enforcement methods.

"The level of oversight the FCC is prepared to provide will not, in the GAO's opinion, provide telephone ratepayers or competitors with positive assurances that FCC cost-allocation rules and procedures are properly controlling cross-subsidy," according to the report.

The GAO report was released at a recent press conference by Rep. Michael Synar (D-Okla.), a member of the House of Representatives Subcommittee on Telecommunications and Finance, and subcommittee Chairman Edward Markey (D-Mass.). The study was requested last year by Synar and then-subcommittee Chairman Timothy Wirth (D-Colo.).

Markey called the report, "A blistering, scalding indictment" of the FCC's accounting and auditing systems. Markey concurred with the GAO, saying the FCC has allocated "only 15 auditors to police a $120 billion industry."

The highly critical report comes on the heels of a similar rebuke leveled against the FCC by U.S. District Court Judge Harold Greene in September, during his triennial review of the Modified Final Judgment.

At that time, Greene refused to grant the RBHCs admission to the competitive long-distance and telecommunications equipment manufacturing markets, in large part because he felt the FCC has not adequately enforced existing RBHC regulations.

The GAO investigation focused primarily on the FCC's 1986 decision to remove the Second Computer Inquiry rule requiring the RBHCs to maintain separate subsidiaries for their unregulated businesses.

In Computer III, the FCC decided to allow the RBHCs to market unregulated services, such as packet switching, through their regulated telephone companies.

In exchange for this regulatory freedom, the FCC required the RBHCs to submit detailed accounting manuals that describe how the costs for regulated and unregulated services would be separated to prevent cross-subsidization. The accounting manuals were submitted to the FCC in October and now await FCC approval.

The illegal practice of cross-subsidization occurs if an RBHC uses the profits from its regulated business to finance an unregulated business. In the eyes of the FCC, the ratepayer should pay only for services used and not for RBHC expansion into new businesses.

The FCC's accounting rules are designed to rely heavily on outside auditors to review the RBHCs' accounting manuals. The GAO said the FCC should rely more on in-house auditors to keep the RBHCs honest.

Since the RBHCs are required to pay for outside audits, the results could be less than objective, according to the GAO report.

FCC Common Carrier Bureau Chief and former head of the Accounting and Audits division, Gerald Brock, approved of several of the GAO's recommendations but said the use of outside auditors was a central component of the FCC's new rules. He also said the use of independent auditors for government reporting is a common practice.

FCC Chairman Dennis Patrick, speaking last week before the House Telecommunications Subcommittee, said the GAO report is "not an attack on the commission's cost-allocation policies. We appreciate the GAO's concerns and have

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FIBER OPTICS

Plastic cable may cut costs by 70%

BY JIM BROWN
New Products Editor

MUNICH, West Germany — A fiber-optic cable made of plastic instead of glass, which could slash the cost of linking computers to a backbone network by nearly 70%, was demonstrated at the Productronics '87 trade show here last week by Hoechst AG and Codenoll Technologies Corp.

The plastic optical fiber, made from a polymer by Hoechst AG, was demonstrated linking two IBM Personal Computers to a 10M bit/sec glass fiber-optic Ethernet backbone.

The plastic fiber technology is expected to be available within the next two years and have a retail price of roughly 80 cents per foot. The average retail cost of glass optical fiber is $2.50 a foot. It costs $8.40 a foot for thick coaxial cable, $3.60 a foot for twisted pair, and $1.20 a foot for thin coaxial cable, according to Fred Scholl, Codenoll's senior vice-president.

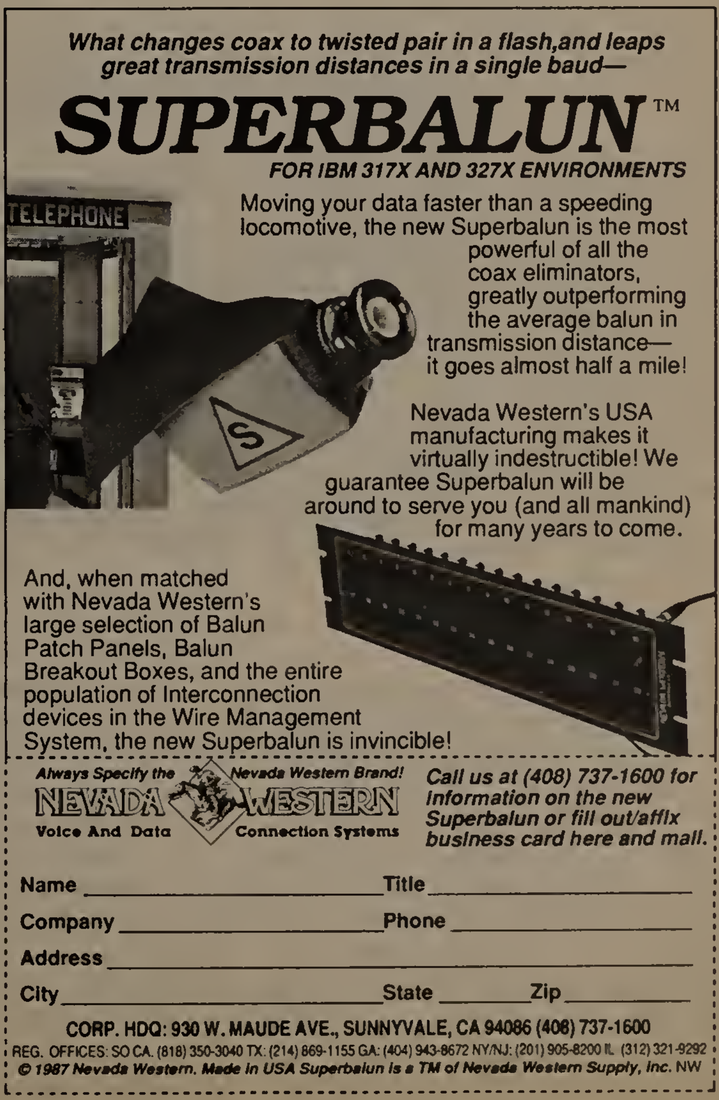
Hoechst AG, which owns 10% of Codenoll, has developed two fiber cables, one with an outside diameter of 1/2 millimeter and a 500-micron core, and another with a 1-millimeter diameter and a 1,000-micron core. Glass fiber-optic cables typically have a 64-micron or 100-micron core. The specially made polymer cable is resistant to heat, humidity and numerous chemicals, Scholl said.

Codenoll has developed 16- and 32-port star couplers that will work with the new plastic optical-fiber cable. That coupler is expected to enable devices to be located up to 200 meters from the coupler and provide a connection to a backbone network.

The technology will also probably require each computer supported to use a Codenoll-developed polymer optical receiver board capable of detecting light signals from a plastic fiber and outfitted with special plastic cable connectors that differ from those used with glass fibers.

Analysts say other firms are also developing plastic fiber-optic cable and agree plastic fiber-optic cable can reduce the cost of linking devices to a backbone network.

"If they can produce it in quantity and it's half the cost of current fiber, they'll win hands down over glass fiber," said David Terrie, editor of "Patricia Seybold's Network Monitor" newsletter and consultant with Scituate, Mass.-based NewPort Consulting. "But a key will be acceptance of the technology by the government, which uses a lot of fiber cable."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RBHCs appeal MFJ ruling

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services such as electronic publishing. "We feel this is a violation of our First Amendment rights. We feel we are justified in seeking relief from the court to offer the full range of information services," he said.

Many of the RBHCs said they will challenge Greene's interpretation of the Modified Final Judgment. "We think he applied the decree standard incorrectly," Goodman said. "We believe the decree says the RBHCs should be allowed to participate in competitive markets such as long-distance services, as long as our entry into those markets doesn't harm competition," he said.

Greene intrepreted the Modified Final Judgment as saying the RBHCs should be allowed into new markets only if their ability and incentive to act anticompetitively no longer exists — a much more stringent legal standard.

A spokesman for Southwestern Bell Corp. said the Modified Final Judgment restrictions are anticompetitive and no longer apply in today's marketplace. "Our freedom to compete in these businesses would benefit the nation's economy and create more quality and affordable services for Americans. This is why we're appealing Judge Greene's ruling," said spokesman Alan Northcutt.

BellSouth Corp. issued a statement saying Greene's order "denied the majority of our requests for relief from the MFJ restrictions. We believe our arguments were justified and will appeal the court's September decision."

RBHC opponents such as the Ad Hoc Telecommunications Users Committee and the International Communications Association have long argued that the RBHCs could use their monopoly power unfairly to raise telephone rates and to stifle competition and, as a result, should be restricted from entering any additional markets.

▶ *HEWLETT-PACKARD CO.*

HP's NewWave eases PC users' net access

BY MARY PETROSKY
West Coast Correspondent

PALO ALTO, Calif. — Hewlett-Packard Co. last week announced an application environment designed to provide personal computer users with a single method to access data and files from multiple sources on a company's network.

HP's NewWave software provides an icon-based user interface designed to make it easier to use applications. It is similar to the IBM Presentation Manager, a graphics-based user interface to be released with OS/2.

Aimed at HP's major customers and software developers, NewWave includes a variety of programming tools for supporting the user interface and for manipulating files and data.

With NewWave, HP is following a trend in the computer industry to simplify the connection between personal computer users and the information they need, whether it resides on the user's own computer or on a remote host. HP has built NewWave on top of Microsoft Corp.'s Windows 2.0 in an effort to leverage what HP believes is an emerging industry standard application environment.

HP also committed to providing NewWave on its minicomputers, according to Peter Shaw, technical marketing manager in the Personal Software Division.

"NewWave is part of our distributed computing environment strategy," Shaw said. Putting NewWave on host systems will give users the ability to move between host-based applications as easily as between personal computer applications, Shaw said.

Besides using icons, NewWave incorporates object-management technology, allowing applications developers to manipulate data and files as if they were objects.

To guarantee the integrity of data across files, HP has included in NewWave an object-management facility it calls "hot connects." Hot connects ensure that data changed in one file is automatically updated in related files in which that data is used. HP believes it is the first company in the industry to offer this capability to link objects so that updates are automatic, Shaw said.

Another NewWave capability, called "agents," is based on artificial intelligence principles. Agents can be set up to perform routine activities automatically, such as gathering data from various computers to create a monthly sales report. A distinguishing characteristic of agents is that this facility will follow a procedure and "remember" it so it can be repeated at a specified time or executed under a given set of conditions.

Using a task, or command, language, NewWave allows programmers to set up connections to computers across a net in roughly the same way that script files are used today to automate logon procedures to host computers. For example, a connection from a personal computer to an IBM mainframe via an HP 3000 gateway can be automated with NewWave, Shaw said.

NewWave acts as a friendly user interface to the communications process and does not itself offer communications capabilities. As a result, the appropriate communications hardware and software must be in place as well as the software supported by the NewWave environment.

"The key is that the end user can focus on the task rather than on the tools required to perform that task," Shaw said.

HP will roll out NewWave in two phases. In Phase One, scheduled for February, HP will ship the HP NewWave Developers Kit to major customers and independent software vendors. The kit is priced at $895. In Phase Two, scheduled for the second half of 1988, the end-user portion of NewWave will be released, along with the first software applications from HP and other vendors. The end-user portion will be priced at $195; users need to buy Microsoft Windows separately.

HP will support its Vectra Office line of personal computer applications under NewWave, Shaw said. In addition, HP has worked with Lotus Development Corp. to develop a NewWave interface to 1-2-3; this interface will be available from HP, Shaw said. A number of vendors of vertical applications software have already announced support for NewWave, and HP is currently negotiating with a number of large software developers for their support of the applications environment, Shaw said.

HP has stated that NewWave will support the Microsoft Operating System/2 and IBM's Presentation Manager in the future.

Contel revamps to hike sales

continued from page 2

national Division, which will be made up of COMSAT International Communications, Inc.'s business when it is acquired from COMSAT later this year.

Contel President and Chief Executive Officer Donald W. Weber said last week that the restructuring will be largely responsible for an estimated $180 to $200 million write-down Contel will take this year.

A Contel spokesman said the restructuring is part of a six-month strategic review on the part of Weber, who is evaluating Contel's strategy to determine in which markets it can best compete.

Weber said the restructuring was necessitated by declining use of Contel ASC's private network facilities and competition with fiber optics-based transmission services. As part of efforts to buoy revenue there, Contel appointed John H. Mattingly, formerly general manager of National Network Services, to the post of vice-president of North American Network Services for Contel ASC's Information Networks Division. The company also has commenced a marketing campaign aimed at changing its detrimental all-satellite image.

"In putting networks together for customers, we've found we need to add terrestrial capability, such as T-1 service, to our network," Mattingly said. "In the past year, we have provided terrestrial facilities on a customer-demand basis, but, as we saw increasing demand for all-terrestrial or hybrid [satellite-terrestrial facilities], we decided to make that offering part of our core business."

Contel users can now order fixed-price terrestrial facilities as part of Contel's basic private network offerings. The company also will offer volume discounts of up to 20% on T-1 satellite service, for contracts of three years or longer.

Mattingly said Contel ASC has lost business from long-distance resellers that have opted to build their own fiber networks in lieu of leasing satellite capacity. But he said he remains confident that the end-user private network business will continue to grow at a steady clip.

A source with a large consulting firm said Contel ASC has a strong market presence and has done an admirable job of "providing specific services to specific market niches, such as the Fortune 200." But he cautioned that Contel ASC is still primarily a satellite company, and users today prefer fiber.

Mattingly said he is banking on Contel's success as a systems integrator tying together all types of equipment. "Our niche is to provide service to those who need an integrator. We will integrate multiplexing functions, various types of customer premises equipment, transmission facilities and all other pieces of the network."

That strategy involves joint ventures with, or acquisitions of, networking equipment companies, Mattingly said, adding that he doesn't expect any such announcements until next year.

Contel ASC's performance is of critical importance to the company. Although nonregulated operations now comprise less than 40% of annual revenue and less than 10% of annual income, the company looks to those operations to generate an ever-larger portion of its yearly growth.

The recent acquisitions of Equatorial and two COMSAT divisions testify to that. But thus far, Contel's track record in nonregulated businesses is wanting. For the third quarter ended Sept. 30, the Federal Systems sector posted losses of $22.7 million, as compared with a $5.6 million gain last year, and the Information Systems sector posted a decrease in earnings to $1.9 million, as compared with $7.6 million last year.

A Contel spokesman attributed the losses in Federal Systems to a number of unidentified contracts that cost more to fulfill than the company bargained for. The numbers for third-quarter Information Systems results, he said, reflected a one-time tax benefit that added significantly to operating profit.

But William Rich, a senior analyst with Northern Business Information, Inc., a research concern in New York, said, "The Business Networks Group, which sells large PBXs, has had trouble making money. They're in an ultracompetitive market. Everyone in that market is looking for a successful niche."

And Contel has one unregulated operation on the auction block, the loss-plagued Executone subsidiary that sells small to mid-range PBXs. Analysts speculate that others will follow. Specifically, some finger the Computer Systems Division and Contel's Texocom unit, which sells telephone supplies to Contel's telephone companies and others.

IBM tips consultants

continued from page 2

chitecture to networks based on the International Standards Organization's Open Systems Interconnect (OSI) model. Consultants said IBM continues to view OSI as an extension of SNA. "IBM's support of OSI will simply be to enable its network architecture to be connected to other network architectures," Myhre said.

Some of that network interconnection may come as early as next year, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "IBM will announce OSI products currently available in Europe, such as X.400 bridges, in the U.S. next year," he said.

Dzubeck also said IBM will soon announce as many as 26 System Application Architecture (SAA) programmer tools that will make it easier for programmers to migrate current applications to work under SAA. With SAA, IBM hopes to develop applications that will run on all its different systems.

The consultants also say IBM is likely developing a 16M bit/sec Token-Ring network as well as a 100M bit/sec Fiber Distributed Data Interface network based on Token-Ring technology.

IBM, Angus said, is also working on a voice and telephony server that will link its private branch exchanges to its computers. Such a product would enable a telemarketing representative to access from a computer the file of a person about to be called and instruct the PBX to dial the number from the data screen.

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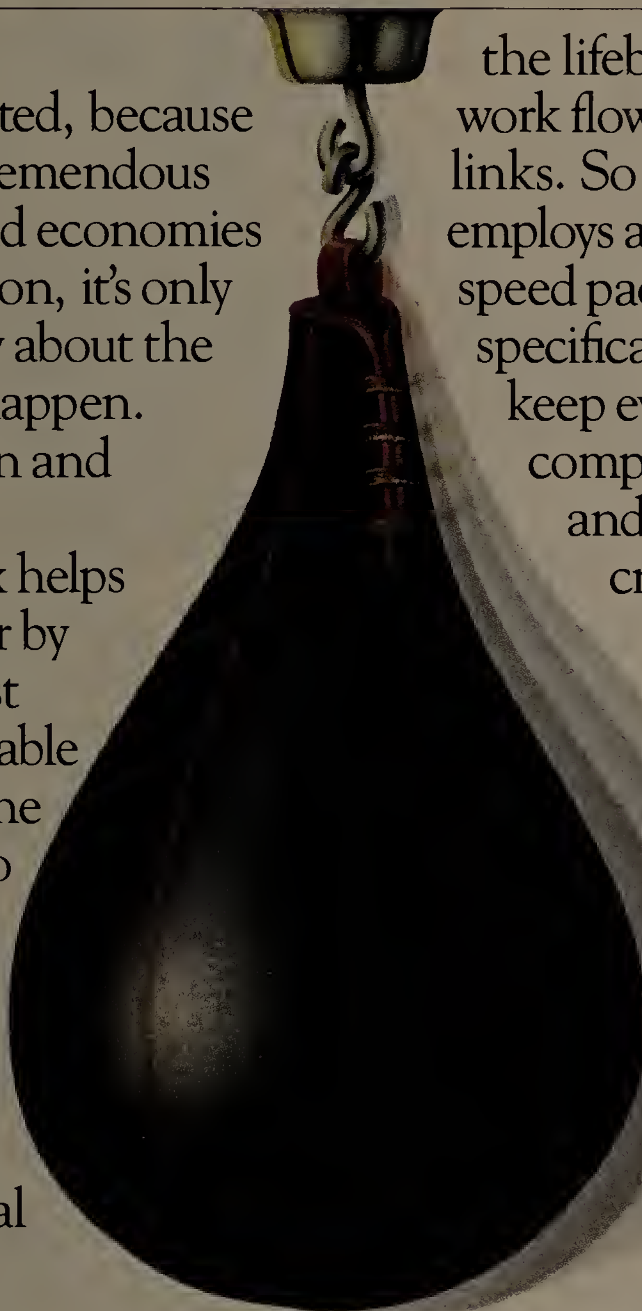

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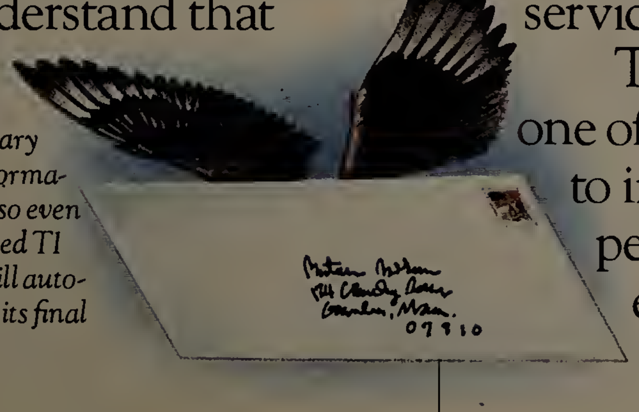

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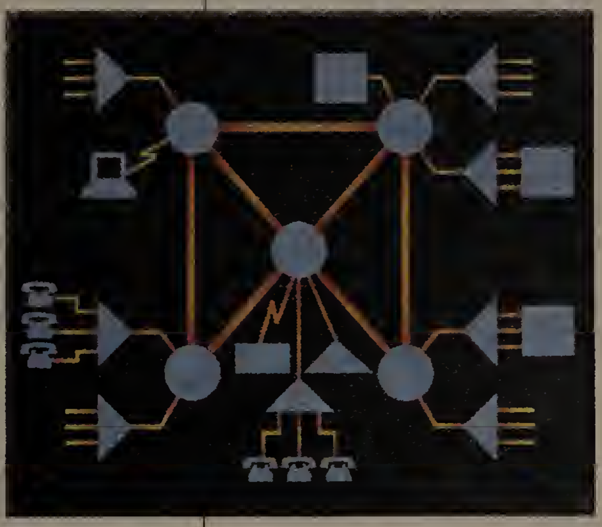

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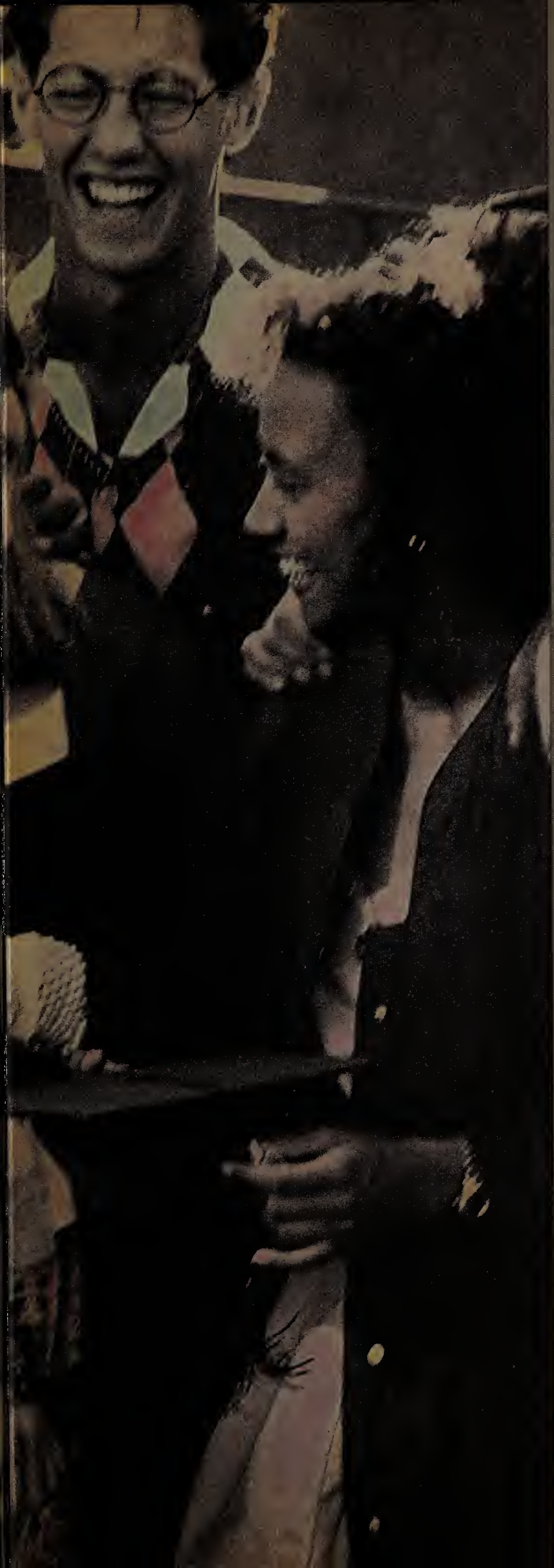

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INDUSTRY UPDATE

Employees buy out AT&T company

Employees of AT&T's Electronic Photography and Imaging Center last week staged an employee buyout of the company, the first such action in the phone company's history. Under a new name, Truevision, Inc., the company will continue to sell its existing line of videographics boards for personal computer-based imaging applications.

JUPITER COMMUNICATIONS REPORT

Study: RBHCs plan to offer info services

Companies hope to enter mass market by 1990.

BY MARY LINEHAN
Staff Writer

NEW YORK — The results of a recent survey indicate that, despite the RBHCs' eagerness to enter the information services industry from which they are currently prohibited, the Baby Bells may not be able to launch successful campaigns in that market for several years yet.

The report, prepared by Jupiter Communications and Magnetic Press, Inc. and based on interviews with strategic and market planners at the seven RBHCs and GTE Corp., said each of the holding companies plans to offer a mass market consumer information service. None of the RBHCs, however, knows when they will do so. The survey also indicated that none of the holding companies will be ready for a "full-fledged mass-market consumer information service" before 1990.

In his Sept. 10 ruling, Greene said the regional Bell holding companies cannot offer information services but can provide transmission for other information service providers. Greene also declined to lift restrictions that currently bar the RBHCs from offering long-distance services.

It said that, by mid-year 1990, each RBHC, with the possible exception of US

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RBHC information services: market readiness rankings

	Interest in entering information services	Likelihood of supplying terminals to the mass market	Existing relationships with information service providers	Experience in providing information services functionality	Progressiveness	Overall technology rating	Timing and magnitude	Average	Rank
Pacific Telesis Group	10	5	7.5	8	10	7	9	8.07	1
BellSouth Corp.	10	6	8	6	8	8	9	7.86	2
Nynex Corp.	10	7	7	7	7	6	7	7.29	3
Southwestern Bell Corp.	10	8	3	3	6	4	5	5.57	4
Ameritech	10	2.5	4	5	6	5	6	5.50	5
Bell Atlantic Corp.	10	6	4	4	5	5	4	5.43	6
US West, Inc.	10	3	7	3	4	6	4	5.29	7

1-low; 10-high

SOURCE: JUPITER COMMUNICATIONS AND MAGNETIC PRESS, INC., NEW YORK

INDUSTRY EYE

PAM POWERS

Examining technospeak's unbridled reign of terror

In the eyes of those who hold the English language sacred, the computer and communications industries pose an unholy threat to the survival of the spoken and written word. Some of the sins promulgated against nouns alone are enough to make the most lion-hearted crusaders for proper English usage renounce their cause in tearful despair, and it's only getting worse.

Of late, the most common offender is the use of nouns as verbs. Integrated Services Digital Networks has not "impacted" the research and development plans of most large communications vendors; however, it has had and continues to have an impact on their plans.

Similarly, users often do not "access" public packet-switching networks through private packet network links, but they do gain access to public data nets through such arrangements.

While examples such as the above are the most common, new versions of bastardized nouns-as-verbs crop up daily and are far more offensive. Now vendors are "transitioning" their installed bases to Open Systems Interconnect compatibility, when they should be effecting a transition to OSI for their users or helping them make that transition. And users are "costing" vendor wares, seemingly the same activity as performing a cost analysis, which is what they did in the good old days.

Our industry has inflicted upon us another series of unofficial verbs that are as graceless as they are incorrect. They include the infamous "beef up," "flesh out" and "ramp up," which now pepper the pages of press releases as vendors attempt to describe their efforts to do such things with product lines or marketing strategies.

It is apparent that this newspeak eliminates a lot of words and, in its own quirky way, streamlines expression. That, after all, is the goal of the high-tech industry: to do everything faster and more efficiently. But maybe precision and attention to detail, two equally admirable qualities, are getting lost in the frenzy. Maybe the fascination for speedy delivery is supplanting the respect for a job done well and with style.

The evolution of the language, many argue, is a natural and acceptable phenomenon that aptly reflects changing times. Language lives, proponents of nouns-as-verbs will say. After all, "ain't" is now condoned as a proper word in the dictionary, and its newly elevated status didn't cause the complete collapse of the language.

But then where does it end? Hopefully, before it's too late, we can access the high-tech community and impact their languaging by beefening up their respect for linguistic laws before they transition to unintelligible technospeak. ◻

CORPORATE TAKEOVERS

Atlantic Research eyes Sequa offer

BY MARY LINEHAN
Staff Writer

ALEXANDRIA, Va. — Atlantic Research Corp., which has been the object of a year-long takeover effort by Sequa Corp., said it will review a recent unsolicited offer by that company and announce its intentions shortly.

Sequa, which already holds an 18.5% interest in Atlantic, said it plans a $30-a-share tender offer, valued at $225 million, for the remaining shares of Atlantic. Sequa purchased a 12.3% interest in the data communications test equipment and defense systems vendor from Clabir Corp. in early October and later that month acquired an additional 5.2% from an investor group that included Halcyon Investments.

Sequa's offer is contingent on Atlantic's board of directors redeeming preferred stock rights and taking other action to permit Sequa to obtain Atlantic shares at $30 a piece. Atlantic, which also manufactures rocket motors and electromagnetic devices, last February rejected a proposal by Clabir to acquire Atlantic or its solid rocket motor division.

During the stock market uncertainty of recent weeks, Atlantic's stock fell from nearly $29 a share to $18.25. Atlantic would not comment on whether the reduced stock price invited Sequa's takeover attempt. Following Sequa's tender offer, Atlantic's stock rose $9 to close at $28.50 on Nov. 4. The stock remained in that range in subsequent trading, closing at at $28.75 on Nov. 10.

Sequa is a diversified manufacturing company whose holdings include aerospace, military electro-optics and electronics equipment as well as container and printing equipment and specialty chemicals.

Separately, Atlantic recently announced an agreement to acquire the liquid rocket propulsion business of the Bell Aerospace Division of Textron. Terms of the agreement were not disclosed. The acquisition of the Bell Aerospace Division had been planned for several months and was not related to the tender offer made by Sequa, an Atlantic spokeswoman said. ◻

T-1 MUX MARKET

Dowty acquires Datatel

BY PAM POWERS
Senior Editor

CHERRY HILL, N.J. — Datatel, Inc., maker of T-1 multiplexers, modems and other data communications equipment, last week said it was acquired for about $40 million by a British-based technology firm, Dowty Group plc.

The acquisition is desirable for Datatel, officials said, because it gives the company access to the coffers of a $1 billion firm with a history of hands-off management.

Datatel, founded in 1979, manufactures and markets customer service units/data service units, limited-distance modems and statistical and T-1 multiplexers to the end-user community. The company recently announced a nodal processor and a high-end T-1 multiplexer.

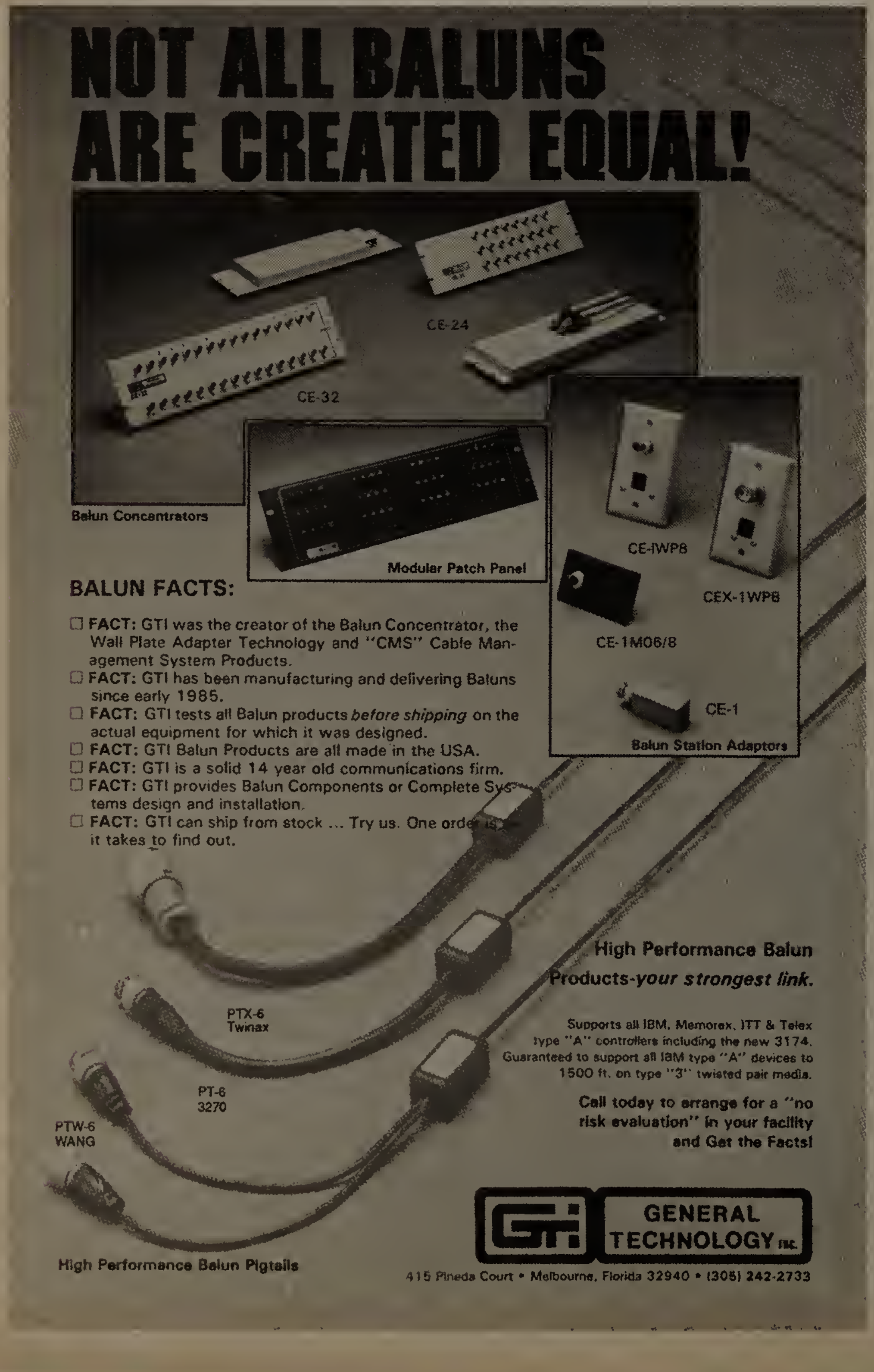
Tom Hornsby, director of marketing at Datatel, said the company is in a period of expansion. "We're adding field service and salespeople at a steady rate," he said, "and we've been in discussion with third-party maintenance firms to boost coverage of our customer base."

Datatel sells some low-end T-1 multiplexers through agreements with both StrataCom, Inc. and Paradyne Corp., but Hornsby said more than 80% of the company's sales are direct to the end user. Datatel sells low-end multiplexing gear as an entree to customer accounts. It then builds on that base with sales of add-on gear that contribute heavily to annual revenue.

Among Datatel's roster of more than 180 customers are Security Pacific Corp., Manufacturers Hanover Corp. and Duke University.

Most sales are currently domestic, but Hornsby said part of Datatel's strategy is to penetrate the international market. "Dowty will help us in that effort by initially selling our products in its markets. A number of its products complement ours," Hornsby said.

Hornsby said future product plans include the introduction of more digital service products and product migration to Integrated Services Digital Network-compatibility. The company also plans to offer some net management products. Its existing line is NetView PC-compatible, Hornsby said. Analysts remarked that the acquisition provides Datatel with firm financial footing, but they said the company has to overcome its lack of name recognition in an already crowded market.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RBHCs plan to offer services

continued from page 11

West, Inc., will have at least a "token consumer information services product in development." Such a service could range from rudimentary gateway systems, with no billing or menuing, to sophisticated services offering features such as Automatic Number Identification Billing, Information Service Provider menus and high-level protocol conversions.

The report divided the timing of entry into information services into three phases: the "development phase," marked by rudimentary systems; the "early adopter" phase, in which the services will be targeted at the personal computer hobbyist and home user; and the "initial critical mass" phase, in which enough customers will be using the system to support the continued mass marketing of consumer services.

Pacific Bell Telephone and BellSouth Corp. are expected to have an initial critical mass of users by 1990, and, at that time, information services will be promoted to the customer base just as call waiting, conference calling and other telephone service features are.

Information services include videotex, packet switching and voice mail.

Greene's ruling, which was part of his triennial review of the Modified Final Judgment, said the RBHCs can provide basic data transmission functions such as signal modulation, error-rate measurement, protocol conversion, address translation and character generation for information service providers. They will also be allowed to handle billing chores for information service providers.

According to Bruce Page, president and publisher of Magnetic Press, Greene's ruling was based in part on his extensive study of the Minitel system in France. Minitel is a highly successful system that provides general consumer access to a host of data bases serving specific information needs — allowing users to access a bus schedule from their home terminals, for example. Minitel offers 3,500 videotex services and 32 million hours of videotex calls per year.

Page, who noted that a 20-day comment period followed Greene's latest ruling, said he expected another ruling from the judge on the RBHCs' role in information services.

Page said that, as the ruling stands, information services would have to be made available to each local access and transport area separately, rather than being universally accessible. This would force the RBHCs to offer information services only to the areas that could economically support such a system.

"In France, there is one packet-switched network, Transpac, and all calls are handled by that medium. So it is economically feasible to install a countrywide system such as this," Page said. "But for the RBHCs to offer information services to the mass market, they would have to be able to cross LATA lines, and they are not allowed to do that, because it would constitute offering long-distance services."

According to the report, the early phase of information services promotion will also witness the first earnest test of subsidized distribution of mass market terminals by the telephone companies. GTE figures to be "especially prominent in promoting this development, since it is the largest major telco that can, at this point, manufacture [terminals]," the report said.

The report gave Pacific Bell the highest overall market readiness ranking and placed BellSouth and Nynex Corp. at second and third. Pacific Bell's ranking is primarily due to its high scores in progressiveness and eagerness to enter the consumer market. BellSouth earned its high marks for its good relationships with information service providers and aggressive timing. Nynex is considered third because of its consistency in offering new services and the quality of its region.

NORTHERN TELECOM LTD.

Firm adds French arm

BY MARY LINEHAN
Staff Writer

TORONTO — Northern Telecom Ltd. recently announced plans to team with two French concerns to form a new company that will manufacture, market and distribute its SL-1 line of private branch exchanges in France and other European markets.

"To start out, we will be marketing these products primarily in France. But we expect to use this as our base for aggressive marketing efforts in other European and Near and Middle Eastern countries," a Northern Telecom spokesman said.

According to the spokesman, Compagnie Generale d'Industrie et de Participation (CGIP) and Banque Worms, the two French partners, will hold minority interests in the venture. Northern Telecom will invest about $50 million and will hold controlling interest in the new firm.

The spokesman said the new company will probably be called Northern Telecom Meridian S.A.

French law requires that foreign companies take on French partners in order to be licensed to sell products. CGIP is a government-run venture capital firm based in Paris, and Banque Worms is a Paris-based bank.

During its first three years of operation, the company is expected to create about 300 new jobs in France.

TELECOM TRENDS

> “The Centrex marketing people need a better technical understanding of how central office switches operate. They need to be able to convert ‘techno-speak’ to English and vice versa. I need them to be able to tell me what the switch can do and, more importantly, what it can’t do.
>
> **Dan Gonos**
> Project manager
> Domino’s Pizza Stores, Inc.
> Ann Arbor, Mich.

USERS GROUP MEETING

Centrex users plan for future

Plot seminars for project management.

BY BOB WALLACE
Senior Editor

ANN ARBOR, Mich. — The National Centrex Users Group, which held its inaugural meeting here recently, attracted service and equipment vendors while providing what many users said was their first opportunity to exchange information with their peers.

Although the meeting offered attendees valuable user-led workshops on topics such as station message detail recording and automatic call distributors as well as contingency planning and disaster recovery, the group’s chairman pointed out one key shortcoming.

“The users group has good general overview product sessions for management, and we have strong technical sessions for the actual [equipment and service] implementors, but we need something in between,” said Richard Jenifer, chairman of the group and a consultant with CNA Insurance Co. in Chicago. “We need something for managers who coordinate major communications projects.”

Jenifer said he has already begun discussions with vendors, including Northern Telecom, Inc. and AT&T, to create vendor-specific seminars for communications managers who coordinate major projects.

According to Jenifer, each session would focus on a particular vendor’s product line. A Northern Telecom product session, for example, could include in-depth discussion of the vendor’s line of central office switches and how they can be used to provide different types of Centrex service.

“We need more vendor-specific information,” Jenifer said. “The vendor could bring in the support personnel needed to provide answers to very product-specific questions. This isn’t like before divestiture, when AT&T made most of the central office switches. We need data on central office switches made by vendors like Siemens [Communications Systems, Inc.], in addition to Northern Telecom and AT&T.”

National Centrex Users Group members will be able to attend these vendor seminars beginning roughly six months from now. After that, the seminars will be held between annual meetings of the group.

Although members of the users group typically deal with only one Bell operating company and one regional Bell holding company, they were able to discuss national plans for Centrex service and equipment development by attending the national meet.

Chris Davis, telecommunications services vice-president for Milwaukee-based Rexnord Data Systems and a founder of the users group, explained the importance of bringing together dispersed Centrex users, many of whom belong to inde-

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CALIFORNIA PUBLIC UTILITIES COMMISSION

AT&T petitions for long-haul liberty

BY MICHAEL FAHEY
Senior Writer

SAN FRANCISCO — AT&T recently filed an application with the California Public Utilities Commission (PUC) seeking greater freedom from long-distance regulations within California.

AT&T is seeking permission to establish pricing bands for existing long-distance services. The bands would serve as boundaries within which AT&T could raise or lower rates without obtaining prior approval from the PUC. AT&T would simply be required to notify the PUC five days before changing rates. Currently, AT&T is subject to rate-of-return regulation in California, which limits the profit it can earn on long-distance service.

In addition, AT&T also seeks freedom to introduce new services in California five days after notifying the PUC. Current regulations require that the PUC grant permission before new AT&T services can be introduced.

In July, the PUC indicated it would consider the type of limited regulatory flexibility AT&T is seeking in its application. No date has been set for a hearing on the application, which was filed Oct. 30.

AT&T submitted a draft of its application to the PUC and other parties in late August. According to an AT&T spokesman, the formal application incorporates suggestions made at workshops held in August and in October, in which consumer and industry groups participated.

“We are seeking greater latitude in setting long-distance prices within California and the chance to introduce new products and services more quickly,” said Bob Stechert, AT&T vice-president for external affairs.

The carrier’s proposal also included a method for monitoring the impact a change in regulation of AT&T will have on customers and competitors. AT&T has asked the PUC to monitor availability of local telephone service and the number of customer complaints AT&T receives.

AT&T also suggested that the availability of similar services from competitors and the emergence of new services and pricing options be used in gauging the effect of relaxed regulation. In addition, AT&T recommended the PUC monitor the frequency of blocked interexchange calls as a measure of service performance and take into consideration the results of a customer satisfaction survey that would be conducted by the carrier.

AT&T proposed a similar method of judging the effect of the plan on its long-distance competitors, in which the PUC would review quarterly financial statements by competitors to determine their ability to compete and grow in the long-distance marketplace between local access and transport areas.

While asking for new freedoms, AT&T’s proposal included a number of commitments to consumers. AT&T promised to reduce its prices as local telephone companies reduce access charges and pledged to continue to provide service to all California communities, regardless of size, and said that new services will be offered statewide. AT&T also promised not to restrict the resale or sharing of its services.

SOUTHWESTERN BELL

RBHC, oil giants sign ISDN pact

Tenneco, Shell seek souped up Centrex.

BY JOSH GONZE
Staff Writer

HOUSTON — Striving for the long-term benefits promised by Integrated Services Digital Network, two oil industry giants here recently signed separate 10-year contracts with Southwestern Bell Telephone Co. for ISDN-compatible Centrex services.

Tenneco, Inc. and Shell Oil Co. will become the first commercial users of ISDN in the Southwestern Bell region when the services are cut over in May 1988.

Both companies said they expect the services will stabilize communications costs, unify existing voice and data networks and make it possible to integrate network support of data terminals that would otherwise be left as stand-alone devices.

The two agreements, arrived at separately but described jointly at the Southwest Communications Association’s October meeting by representatives from the three companies, call for implementation of voice and data Centrex services over ISDN circuits. Tenneco will use about 3,000 circuits to provide voice and data communications for

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PBX market opportunity within regional Bell holding company territories

	Projected market value in millions of $	
	1987	1990
BellSouth Corp.	$1,022	$1,098
Ameritech	$909.3	$946.2
Nynex Corp.	$812.9	$886.8
Pacific Telesis Group	$686.0	$741.5
Southwestern Bell Corp.	$648.8	$737.7
Bell Atlantic Corp.	$619.9	$663.4
US West, Inc.	$588.9	$626.8

These estimates include new switch installations, replacements and upgrades to current private branch exchanges.

SOURCE: THE MARKET INFORMATION CENTER, INC., MARLBOROUGH, MASS

TELECOM TIDBITS

Rep. Edward Markey (D-Mass.), chairman of the House Subcommittee on Telecommunications and Finance, along with 12 other subcommittee members, recently sent a letter to the Federal Communications Commission expressing strong opposition to the enhanced service provider (ESP) access charge plan.

The 13 Democratic lawmakers on the subcommittee said the FCC proposal could harm the future growth of the vital information industry; could prevent residential and nonprofit business customers from using on-line data bases; and could negatively affect the U.S. international trade position.

The legislators estimated that the proposed ESP access charges, which would be passed on to end users in the form of higher service rates, could increase user costs by as much as 450%.

The lawmakers also wrote that the plan as proposed by the FCC would be virtually impossible to administer. The letter said it would be difficult at best for the local Bell operating companies to determine who was using local access and how it was being used in order to assess correct charges on various types of ESPs.

The subcommittee held a hearing on the access charge plan Oct. 2 in Boston. No additional hearings or legislative action is planned.

Opposition is mounting to **AT&T's** request for a waiver of the FCC's network disclosure rules in relation to a multimillion dollar **Virtual Telecommunications Network Service** contract with E.I. DuPont de Nemours & Co., Inc.

AT&T asked the FCC in September for a waiver of the network disclosure rules to allow it to connect **Network Equipment Technologies, Inc.** multiplexers to the AT&T long-distance network in order to provide T-1 transmission service to DuPont.

DuPont already uses several NET multiplexers and will require AT&T to install similar equipment on its end of the T-1 link for compatible communications.

IBM, the **Independent Data Communications Manufacturers Association, Northern Telecom, Inc.** and **GTE Corp.** all opposed AT&T's request, claiming AT&T's plan does not merit a waiver.

The network disclosure rules require AT&T to provide all competing equipment vendors with the same network interface information in order to give all types of equipment equal chance of interconnection to the carrier's national telecommunications network.

NET filed comments with the FCC, saying it would rather lose the lucrative DuPont/AT&T multiplexer contract than disclose the proprietary communications protocols used in the NET gear.

NET said AT&T has no incentive to discriminate against equipment vendors or to give preferential treatment to the NET gear because it is not manufactured or marketed by AT&T. **Pacific Bell Telephone,** in its comments to the FCC, supported AT&T's request, saying it was not discriminatory against other customers or equipment vendors.

Eight customers in a rural area near Ripley, Miss., started using a new kind of telephone service last month as part of a **South Central Telephone Co.** field trial of a digital radio loop system.

The trial, the first of its kind in the nine-state territory served by BellSouth Corp., is testing the use of the radio loop system that eliminates the need for all cable connections between customers and telephone company central offices. Each customer has an individual receiver and antenna that transmits between the customer's location and a base station at or near the central office.

The field trial is expected to last about six months.

AIM Telephones, Inc., a Parsippany, N.J.-based firm that designs, sells, installs and services private telephone interconnect systems, announced Oct. 26 that it has acquired **Crescent Industries, Inc.** of Greensboro, N.C.

Crescent Industries serves approximately 1,400 customers as a distributor and installer of NEC America, Inc. and other telecommunications vendors' equipment.

Earlier in the month, AIM reported net income for the quarter ended Aug. 31 rose 28% to $331,000, or 8 cents per share, from net income of $259,000, or 7 cents per share, in the comparable quarter of 1986. Sales for the three months rose 22% to $7,623,000 from $6,272,000 the prior year.

For the six months ended Aug. 31, net income rose 34% to $618,000, or 16 cents per share, from last year's net of $461,000, or 13 cents per share. Sales climbed 32% to $14,568,000 in the first six months of 1987 from $11,036,000 in the first half of 1986.

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Centrex users plan for future

continued from page 13

pendent regional Centrex users groups.

"Every RBHC is doing something different in terms of Centrex service in their region," he said. "We need to know what Centrex service features each RBHC is offering as well as how they are pricing these various features."

Davis predicted that the National Centrex Users Group will give its members insight into their service vendors' plans for enhancements and equipment vendors' product development efforts. "The group will give us more clout with these vendors," he said.

Davis, who helped lay the groundwork for the National Centrex users group, said one of the users group's immediate challenges is to explain to both Centrex users and companies using private branch exchanges that the central office-based service is still very much alive. "Many users are under the misconception that Centrex is dead," he said. "We have a lot of reeducating to do."

Jim Yeip, a telecommunications analyst with Federal-Mogul Corp.'s Information Resource Management group in Southfield, Mich., said the interaction with other Centrex users at the meeting was of inestimable value. "I need to find out what types of applications other companies are using with Centrex." ☐

RBHC, oil giants sign ISDN pact

continued from page 13

employees and facilities in five major buildings in a roughly 12-mile radius, while Shell will use 1,000 circuits to support two adjacent buildings. Both companies were previously Centrex users.

"We were concerned about the proliferation of specialized and incompatible local networks over the Houston campus, and also the piecemeal, inefficient implementation of switched services for a wide range of applications," said John Saccente, director of corporate telecommunications at Tenneco. "In the absence of ISDN capability, we would continue to have island solutions all over the place and never a uniform way of interconnecting with the system."

How it works

The services will be provided from an AT&T 5ESS switch equipped with ISDN software in a Southwestern Bell central office in downtown Houston. Shell's circuits will be supported from a 5ESS switch module linked with fiber-optic cable to the central switch.

Each user circuit will support the ISDN 2B+D Basic Rate Interface (BRI), which provides two 64K bit/sec channels for voice or data and a 16K channel for signaling information. The network will not support any T-1-like Primary Rate Interfaces, the specification that breaks down a 1.54M bit/sec link into 24 64K bit/sec channels, of which there are 23 B channels and a D signaling channel.

The 5ESS used to support the oil companies will also serve non-ISDN users in surrounding areas, according to Southwestern Bell Senior Design Consultant Linda Hobson.

Long-distance traffic will be carried over non-ISDN facilities, since at cutover there will not be any other ISDN-equipped switches in Southwestern Bell's public network, Hobson said.

Hobson said the BRI circuits require two-to-four wire conversion at both ends. At the central office, the conversion device is a board known as a U-interface card. At the customer premises, users must install an interface called an NT1 for each end user, either on each desktop or in racks in a central equipment room.

Saccente said ISDN will eventually improve data communications at Tenneco by giving IBM 3270 terminals access to remote central-site IBM controllers, enabling personal computers to access mainframe applications and providing flexible access to existing local networks.

Centralizing controllers will enable the company to maximize their use by providing port contention, Saccente said.

Personal computers will use the D channel to communicate with mainframe applications such as IBM's Professional Office Systems, Saccente said. He said he expects other ISDN adapters for personal computers will be released that will also enable microcomputers to communicate using ISDN B channels.

The ISDN capability will also improve a voice mail system Tenneco is planning to cut over next year. "ISDN terminals give us the message-waiting-lamp capability, which we feel we need for a successful voice mail system," Saccente said.

Billy King, telecommunications supervisor at Shell, emphasized "the importance of standardizing telecommunications via CCITT standards," but declined to describe the specific benefits the company expects to derive from ISDN. ☐

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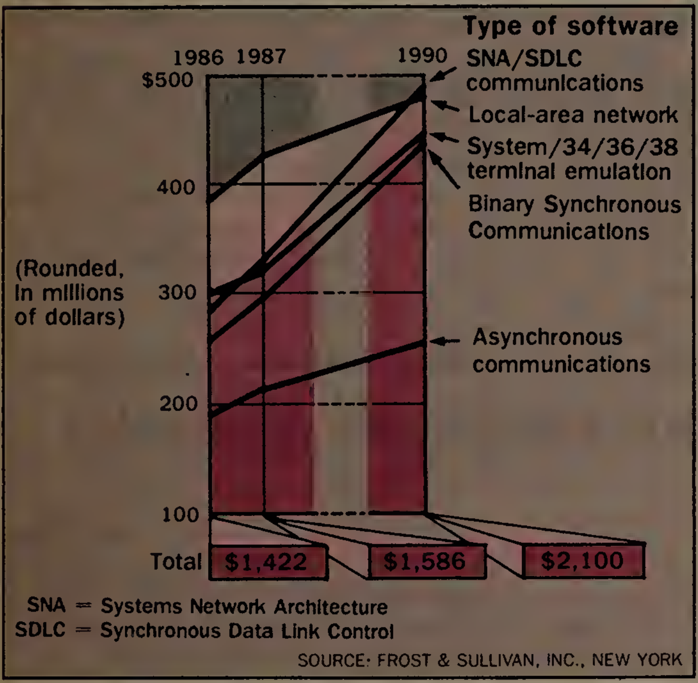
LOCAL NETWORKING

> “Have you ever seen the error message the PC network user gets when there’s a problem accessing the server? It says, ‘Error reading disk drive. Abort, retry or ignore?’ Those are the choices I used to have on a date!
>
> **Craig Burton**
> Senior vice-president
> Corporate marketing and development
> Novell, Inc.
> Orem, Utah

Market forecast: sales of PC communications software



SNA = Systems Network Architecture
SDLC = Synchronous Data Link Control

SOURCE: FROST & SULLIVAN, INC., NEW YORK

MADGE NETWORKS, INC.

Madge unveils fast token ring

Twice as quick as IBM’s.

BY MARY LINEHAN
Staff Writer

ROANOKE, Va. — Madge Networks, Inc. recently introduced a token-ring network that, according to the vendor, operates twice as fast as IBM’s Token-Ring Network running IBM’s PC LAN network operating system.

The Madge Token-Ring network adheres to the IEEE 802.5 networking standard and can support IBM’s Personal Computer XT, Personal Computer AT, Personal System/2 Model 30 and most compatibles. The vendor said the network is also plug-compatible with IBM’s Token-Ring Network, meaning it can be used to expand existing Token-Ring Networks.

According to a company spokesman, the Madge network can run twice as fast as an IBM Token-Ring due to operating system efficiencies and the fact that Madge’s 16-bit network interface boards support direct memory access.

Introduced last spring in the UK and Europe by Madge Networks, Ltd. of England, the Madge Token-Ring network is now being marketed in the U.S. by Madge Networks, Inc., a subsidiary.

The vendor said all of the Madge Token-Ring hardware and software is modular, allowing the user to configure a customized network.

Madge’s adapter cards operate with equal efficiency under Novell, Inc.’s NetWare or IBM’s PC LAN and with other high-speed compatibles from vendors such as Compaq Computer Corp. and AST Research, Inc., the vendor said.

The network’s ring hub is interchangeable with IBM’s Multistation Access Unit, and a four-station local ring hub can be used to expand networks or to create smaller networks.

Madge Token-Ring components include the Personal Computer Adapter Kit, which is a plug-in adapter card plus network operating

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LAN SAFEGUARDS

MetLife seeks CPU-type security for micro LANs

BY PAULA MUSICH
Senior Editor

NEW YORK — Security is an afterthought to many local network users, but the pensions division of Metropolitan Life Insurance Co. worked to provide mainframe-like security on its personal computer networks from the very beginning.

The pensions division installed its first pilot network three years ago. It now has Ethernets installed in three different departments and is working on a fourth installation. Workers in the division’s administrative and marketing departments are using networks to share off-the-shelf and internally developed applications, as well as expensive resources such as laserjet printers. The networks supporting these users are based on five Banyan Systems, Inc. servers and support 115 workstations. Some of the servers also provide access to IBM hosts through a 3270 gateway function.

Another recently installed local network supports mainframe application developers who work on personal computers and then upload their work through the gateway function in Banyan servers. In addition, another network will soon be installed to support actuaries in the financial department.

Pensions brought its security consciousness to the microcomputer environment from the mainframe world, where requirements for creating secure applications were strictly enforced. Security involves maintaining the integrity of data shared by users and protecting sensitive information from unauthorized access.

“In the mainframe environment here, we have some very strict rules on how we develop applications and how our environment is to be secured,” explained Paul Trenkner, project manager in pensions systems planning. “Now that we’re developing applications in the micro environment, where security is considerably more difficult to enforce, we have to maintain the guidelines that apply to us. That’s a corporate standard we have to adhere to.”

Pensions’ systems analysts added another level of security to the security functions pro-

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LANMARKS

ERIC H. KILLORIN

The age of network computing

First there were multiuser systems, a time-sharing approach that allowed terminal users access to a centrally located mainframe. Then came proprietary networks for moving information within a single vendor’s family of computers. Soon, local-area networks became the buzzword for lower level datagram services that allowed resource and information sharing among computers from different vendors. Now, Apollo Computer, Inc. of Chelmsford, Mass., is attempting to establish its concept of Network Computing as the next generation of computer networking. What is Network Computing, and what does it mean to local-area network planners?

First, let’s remember that local-area networks allow users to share files and documents with and send mail messages to other users whose equipment is connected to the same network, either directly or via a gateway. Middle- and upper-layer services extend the functions of local networks but are implemented so they do not compromise users’ investment in the lower level services, that is, Ethernet. Network Computing not only lets users share documents and expensive peripherals, it offers much more. It makes computers connected to the local-area network act as shelves of a user’s application. With Network Computing, a complex application can be divided into discrete modules for processing on nodes best equipped to handle that portion of the application.

For example, a three-dimensional solids modeling application may have a series of complex math formulas that would best be handled by a Cray Research, Inc. supercomputer or large IBM system. The graphics representation of this program could be handled by a specialized parallel processor, and the what-if scenarios could be handled by a VAX, MicroVAX or a minicomputer with idle capacity. Network Computing is distributed processing or, more appropriately, network resource management in its ultimate guise. It balances the processing load of networked computers based on the requirements of the application. The end result is more efficient use of CPU cycles and faster application processing.

Instead of boosting network throughput to speed network transactions, Network Computing solves the bottlenecks right at the CPU. It queues jobs only to processors that can understand, perform and return the application with the greatest combination of speed and efficiency.

Apollo’s Network Computing arrived as recently as February of this year, but al-

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Killorin is the publisher of “Netline,” a newsletter on computer networks published by Hyatt Research Corp. in Andover, Mass.

NETWORK NOTES

Atari Corp. will distribute **Network Research Corp.'s (NRC)** Fusion network software with its Atari Mega workstation under terms of a recently signed agreement. With NRC's Fusion, Atari's Mega workstation, which operates under Whitesmiths, Ltd.'s Unix-like IDRIS operating system, will be able to link with networks supporting Transmission Control Protocol/Internet Protocol.

Atari will also distribute NRC's Network Management Software (NMS) and Program Development Libraries (PDL). NMS monitors net traffic and displays statistics concerning packet transmission and reception.

PDL, a set of 50 library functions modeled after Berkeley Software Distribution Unix Version 4 Release 2 IPC Library calls, enables programmers to create network applications that run on any computer linked to the network.

InterConnections, Inc. recently released I* software, which enables devices on an Ungermann-Bass, Inc. Net/One local net to access Digital Equipment Corp. VAX computers.

The VAX-resident software uses existing DEC interface boards to link to the Net/One network. License fees start at $5,000.

Lanex Corp. recently released its MAC Layer Bridge, Broadband Transceiver and Lanex PC Interface. The $3,995 MAC Layer Bridge links physically separate 802.3 nets to a backbone Ethernet, broadband or fiber-optic cable. The $595 Broadband Transceiver links Ethernet devices to a broadband local net, while the $632 Lanex PC Interface board links IBM Personal Computers to a broadband net and supports terminal emulation and file transfer via an IBM Network Basic I/O System interface.

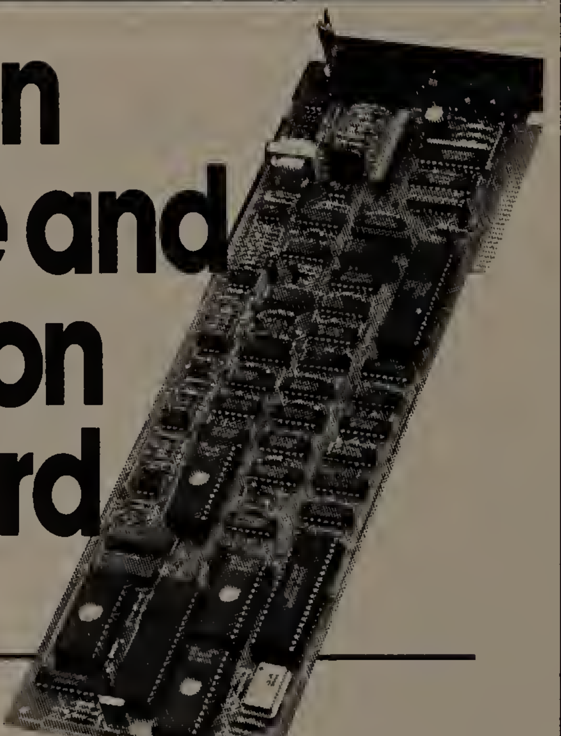
Madge unveils fast token ring

continued from page 17

software for the IBM Personal Computer and Personal Computer AT, and the AT Adapter Kit, a plug-in adapter card plus network operating software for IBM Personal Computer ATs and XTs running on the Intel Corp.'s 80286 microprocessor. A Starter Kit with two Personal Computer adapter cards, one local ring hub, cables and software, allowing operation as either a stand-alone Token-Ring network or an addition to an existing network, costs $1,850.

3270 MICRO-MAINFRAME Sync-Up™ 3780

Emulation Software and Modem on One Board



DataSYNC 3270 and DataSync 3780 combine Winterhalter's DataTalker emulation software with the UDS Sync-Up modem boards (201C, 208A/B).

DataSYNC 3270
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The age of net computing

continued from page 17

ready it is showing promise as a solution to the sophisticated requirements of the technical community. Lofty goals are expected of Network Computing, not the least of which is Apollo's ambition to have it accepted as an industry standard.

The firm's Network Computing Forum, a consortium of 76 users, vendors and other interested parties, hopes to keep the concept of Network Computing alive and well and very much on the agenda of the Corporation for Open Systems (COS). Apollo rival, Sun Microsystems, Inc., is a member of the Forum, and so is Digital Equipment Corp.

Add several heavyweight Fortune 1,000 users and you wind up with a team of players whose collective thinking could shape much of the standards activity in local-area networks during the next several years.

Network Computing is not without its faults. The concept, and especially the implementation, is far from reaching a mature enough stage to be adopted outside of Apollo's very specific Domain environment. The overhead associated with Network Computing may relegate it to only performance-minded users, not the cost-conscious users that characterize the low end of the local-area network market. Still, the utilities that support Network Computing could be shaped and molded to just about any environment, effectively giving users with other application needs a way to get the most out of their local-area network by getting the most out of their CPUs.

MetLife seeks CPU-type security

continued from page 17

vided in Banyan's Virtual Networking Software (VINES). That second level of security includes a front-end menu system that personal computer users see when they log on to their computers.

The menu system takes advantage of a VINES utility that allows network administrators to set up user and group profiles in a server. The profiles define which network resources can be accessed by an individual user or groups of users. "We had to develop a dual-personality system. We control access based on how they sign on," said systems analyst Michael Bianco.

IDs provide access to either a so-called application environment or a personal computing environment. In the application environment, users are allowed to access data base applications for product and customer information as well as word processing applications resident on the network server.

> Another risk is that competitive information would fall into the wrong hands. "We have a lot of information about our clients on our servers. If someone got ahold of that list, they would have the edge on us," Bianco said.

Such applications were developed internally for users not comfortable or familiar with personal computer technology.

"Many of the PC users aren't really familiar with the PC," Trenkner said. "We didn't want to train them in the intricacies of using the PC. Users just needed to get a job done, and automating certain functions made that easier." In the personal computing environment, more savvy users are allowed to access off-the-shelf applications resident in their personal computers, and they are allowed to work with the DOS operating system.

"Users have a log-on screen that asks for identifying information, such as a password, and which environment they're going to be working in," Trenkner said. "In the personal computing environment, they can go in and edit files. It's an area where users who know a little bit more about DOS can use WordPerfect, Lotus or graphics packages."

Users in this environment cannot access application environment files, data bases or mainframe applications.

"The applications environment is controlled by menus from which users cannot escape," Trenkner explained. In this environment, users aren't allowed to get to the DOS prompt because they could destroy the integrity of shared information. "If we let them out to the DOS prompt, our file integrity would be compromised because they could delete or change files, and we'd never know it," Bianco said.

"If the integrity of the files on the server is compromised, it could be very embarrassing, and the information could be very costly to reproduce," Bianco continued. "We don't want to leave ourselves open to that kind of risk."

Another risk is that competitive information would fall into the wrong hands. "We have a lot of information about our clients on our servers. If someone else were to get ahold of that list, they would have the edge on us," Bianco said. "Even if someone inside our company accessed that information in a format that we weren't able to control, they could then leave the company and have a competitive edge on us."

"In the old environment, each rep had all of his information at his desk," Trenkner said. "If that rep didn't secure it, we were at risk for one thirtieth of our book of business. Now that everything is on a networked computer, our entire book of business and prospective book of business is at risk."

DATA DELIVERY/ NET MANAGEMENT

Lucci wins tech award

Al Lucci, founder and chairman of the board at Avanti Communications Corp., was recently awarded the Rhode Island Governor's Science and Technology Award. The annual award is given to individuals who have made outstanding contributions to the state in areas of research and industrial innovation. Avanti, based in Newport, R.I., was one of the pioneers in the T-1 multiplexer market.

ANALYSIS

Market changes for matrix switch firms

As growth slows, firms develop new products.

BY PAUL KORZENIOWSKI
Senior Editor

After years of steadily increasing sales, matrix switch vendors are busily preparing for an era of slower growth that will force them to develop new types of products to satisfy changing customer requirements.

A matrix switch routes data between two or more front-end processors. If a front end fails, the switch will automatically switch lines to a spare unit and ensure network availability.

Analysts say market saturation will slow the 10% to 20% growth rate that has characterized the relatively small matrix switch market during the past three to five years. This is evidenced by a recent International Data Corp. (IDC) survey that found only 1,700 of 85,000 companies had more than one front-end processor.

Katherine Korostoff, an analyst with IDC, a market research firm in Framingham, Mass., said many of these companies have already purchased the products and predicted that a growing portion of matrix switch vendors' revenue will come from add-on sales to existing customers, rather than sales to new matrix switch users.

Three companies, Bytex Corp., Data

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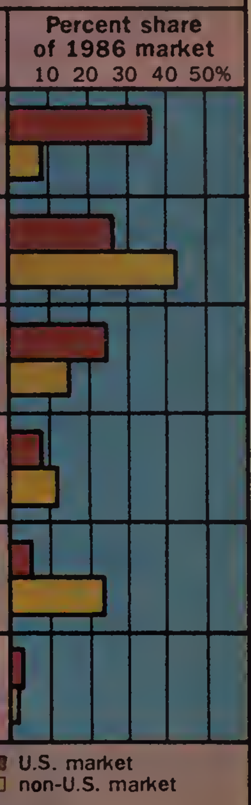
Matrix switch vendor profiles

Vendor	Product names	Maximum number of ports
Bytex Corp.	Autoswitch 240 Autoswitch 480 Autoswitch 1000 Autoswitch 4000	240 480 1,024 4,096
Dynatech Data Systems	CTM-250/500 CTM-1000 CTM-2020*	512 1,024 2,048
Data Switch Corp.	Monolith XY-MAX Galaxy	320 1,024 2,048
Codex Corp.	4803	1,440
Infotron Systems Corp.	INX4200	1,000
Telenex Corp.	Autonex Mini Matrix Autonex	128 512



* 4,096-port capacity with the 4040 enhancement

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

DATA DIALOGUE

PAUL KORZENIOWSKI

IBM backs communications horse

IBM has laid the groundwork for shifting its revenue stream away from mainframe sales to purchases of communications products. The shift stems from the company's aggressive plans to become a $100 billion company by the early 1990s.

John Reynolds, vice-president at Communication Associates, a consulting firm in Natick, Mass., said IBM examined its future plans three years ago. At that time, the company had already locked up many segments of the computer market, and no other hot areas that promised quick, dramatic growth were in sight.

In addition, the computer market was evolving into a commodity market. Technical advances during the last 30 years had produced reliable equipment based on stable components. Competitors could easily design new computers because a growing number of companies produced system components. Consequently, IBM faced a growing number of new challengers in all sectors of the computer market.

Reynolds said that IBM executives met to identify new opportunities. The company was a relatively minor player in most communications markets, and the executives understood that communications would increase in importance during the '90s. So the team decided to start by increasing IBM's share of traditional markets, such as modems, as well as becoming the leader in emerging markets, such as communications software.

At this point the company decided to shift emphasis to communications products.

Having made that decision, IBM networking gurus sat down to mold SNA into a network architecture that could support large users in the '90s. The gurus decided to make Systems Network Architecture the glue linking all systems.

So IBM began coaxing competitors and third parties to attach their wares to SNA networks by holding seminars and publishing specifications. As a result, for the past two years, the company has been touting the openness of SNA. However, some analysts and users remained skeptical. Traditionally, IBM had made it difficult for competitors to design SNA-compatible products, and the recent statements were antithetical to IBM's traditional attitude.

Recently, the strategy became clearer. Since IBM had made a substantial investment in SNA, the company had no intention of opening it up completely, actually allowing competing vendors' products to move information from node to node on SNA networks. The key for IBM is the backbone network, which the company considers proprietary. By controlling the backbone network, the company could open up SNA without losing its competitive edge.

IBM has made it easier for competitors to build nodes that attach to an SNA network but at the same time made it difficult to design products that move information over an SNA network.

The strategy will affect a number of companies. Front-end processor vendors will have even more problems keeping pace with IBM. Big Blue dominates the front-end processor market with close to 70% of all sales, according to analysts.

Thus far, IBM's strategy seems to be working. Analysts report that the Communication Products Division is ahead of its revenue projections. The company correctly identified network management as a key element in its strategy and currently has a huge lead in integrated net management systems.

The company seems committed to filling in the missing pieces and making SNA the backbone network for corporations large and small. Competitors may have to rethink their plans, since IBM has dramatically altered its strategy.

U.S. ROBOTICS

Internal modem for PS/2 bows

BY PAUL KORZENIOWSKI
Senior Editor

SKOKIE, Ill. — U.S. Robotics, Inc. unveiled its first internal modem for the IBM Personal System/2 earlier this month and added data compression capabilities to its high-end model.

The company's Courier 2400e/PS, an integrated modem, works with the Micro Channel architecture used on the IBM Personal System/2. The product operates at 2,400 bit/sec and conforms to the CCITT V.22bis standards for dial-up or leased-line connections. The full-duplex modem has fallback speeds of 1,200 and 300 bit/sec. It uses Microcom, Inc.'s Microcom Network Protocol data compression protocol to support transmission at a speed of 4.8K bit/sec. The Courier 2400e/ PS sells for $699 and will be available next month.

The company also enhanced its Courier HST modem to transmit data at a speed of 17.4K bit/sec. Previously, the device operated at a speed of 11K bit/sec. The full-duplex modem is designed for use on dial-up lines and works with trellis-coded modulation to support its high-speed transmission.

The product also uses Microcom's MNP protocol and has fallback speeds of 9.6K, 7.2K and 4.8K bit/sec. It sells for $995.

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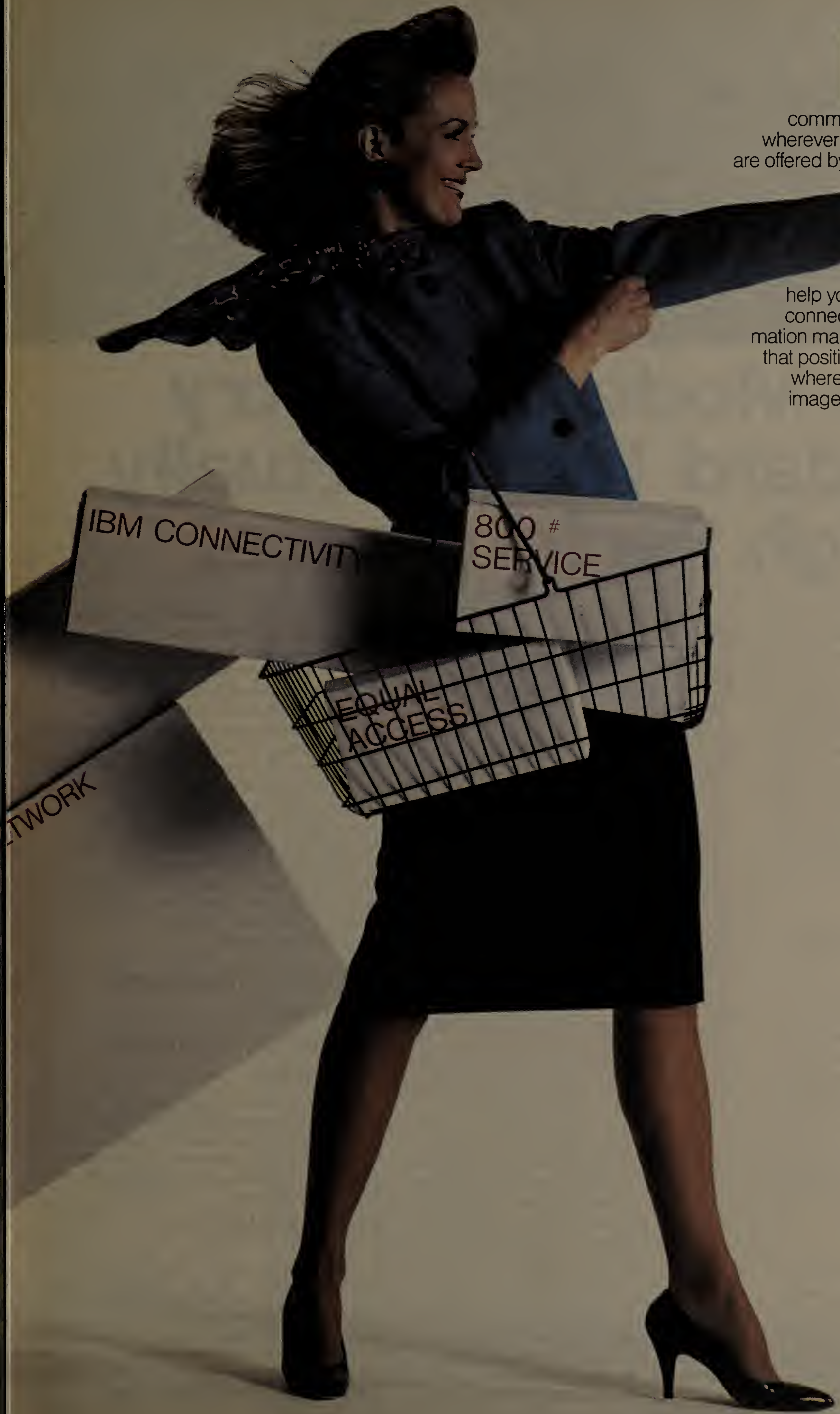

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NETWORKING

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Employs industry standard MNP	yes	no
# of compatible MNP modem vendors	40+	0
Supports CCITT V.29 FT modulation	yes	no
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Matrix switch sales to slow

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Switch Corp. and Dynatech Data Systems, dominate the matrix switch market. They agree the days of 20% growth rates are gone but predict healthy growth for at least the next few years.

Recognizing changing market conditions, the companies have designed new types of switches to attract new customers. The most significant recent change was the introduction of distributed matrix switches, which enable a customer to place a matrix switch in departments rather than in a computer room.

The new switches can be located up to 1,000 feet from a host processor and help customers cut down the amount of equipment in computer rooms, which have become crowded in the last few years.

With the new switches, customers can drastically cut their cabling costs. Matrix switches act like multiplexers and consolidate traffic, so 10 terminals in a department can be connected to a host by one cable, rather than 10 separate lines. All three companies recognize customers' need for distributed switches and are delivering them.

A second change was the introduction of high-capacity matrix switches. A few years ago, the largest switches supported approximately 1,000 ports. Last fall, Bytex upped the ante with its Autoswitch 4000, which can support 4,096 ports. Dynatech recently enhanced its CTM series of matrix switches to handle 4,096 ports as well.

Vendors claim the new switches meet the needs of the nation's largest network users, but analysts say they do have significant limitations. Larry Cynar at Dataquest, Inc., a San Jose, Calif., market research firm, said, "There are not a lot of companies that need a switch with that many ports."

Tom Flanagan, product manager at Dynatech, said convincing customers to purchase a large matrix switch is more difficult than selling them a small matrix switch. The evaluation process may take six months rather than three months. A customer examines how well the product fits into a corporation's networking strategy rather than viewing a matrix switch as a stand-alone entity.

Because customers are looking at complete networking pictures, Dynatech has been increasing the breadth of its product line and positioning itself as a full-line communications supplier. Currently, the company sells T-1 multiplexers, data service units/channel service units and an integrated network management system.

Dataswitch has also been gradually broadening its product line, which now includes network management systems and channel extension units. Last year, the company purchased T-Bar, Inc., in the largest acquisition made yet by a matrix switch company.

For the moment, Bytex seems content selling only matrix switches. However, Barry Charton, director of marketing at Bytex, said the company is not married to matrix switches and understands it must broaden its line. Bytex is examining future products that may meld matrix switch functions with other types of equipment but has ruled out trying to become a full line equipment supplier.

Bytex has used OEM agreements to increase its revenue, enlisting Racal-Milgo, Inc. in 1985 and IBM the same year as market partners. Recently, Racal-Milgo announced it would start selling the Autoswitch 4000 in addition to Bytex's other low-end matrix switches. IBM's agreement covers only the company's low-end models, and the company has not committed to reselling the high-end products.

The success of each company's strategy will become evident when sales growth slows down in a few years. ☑

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COMMUNICATIONS MANAGER

> “Historically, data processing people have looked down their noses at telecommunications.
>
> **Chuck Garrison**
> Assistant vice-president of telecommunications
> Chicago Board Options Exchange
> Chicago

Average communications manager salary by industry *

	Average 1986 base salary	Average 1985 base salary
Natural resources	$73,509	$69,320
Manufacturing	$67,818	$63,386
Nonbank financials	$64,845	$57,444
Bank and bank holding companies	$64,164	$59,000
Consumer products	$62,514	$57,086
Service	$61,946	$59,073
Education	$59,675	$54,250

* Vice-presidents and directors only

SOURCE: INTERNATIONAL COMMUNICATIONS ASSOCIATION, DALLAS

BOOK REVIEW

Fundamentals of Negotiating, Gerard Nierenberg (Harper & Row, New York), reprinted 1987, $7.95.

The difference between a communications planner who routinely wins funding for expensive network projects and one who can barely get the go-ahead to replace a 300 bit/sec modem is often the ability to negotiate.

Gerard Nierenberg's *Fundamentals of Negotiating* provides a systematic approach to successful negotiation in almost any situation, including the communications budget request. Approaching senior management for budget increases or special project funding is more successful, Nierenberg writes, if the request is backed up with research and the timing is appropriate.

Requests for project funding should be based on the boss's own needs and goals as well as the merits of the project itself. The request must be described in terms that make it attractive to all parties involved.

The book is meant to address all negotiation situations and does not specifically address the telecommunications manager. But its lessons may be valuable for network managers who need solid grounding in the basics of negotiation.

One strategy Nierenberg endorses is treating the subject under negotiation as a joint problem rather than as a demand.

For example, a request for a new private branch exchange might be described as a solution to a competitive need to offer improved telephone service, rather than as the telecommunications department's wish to avoid fixing the old PBX.

See **Book Review** page 26

VOICE/DATA INTEGRATION

Firm blends departments

Drug company Bergen Brunswig increases its efficiency.

BY MICHAEL FAHEY
Senior Writer

ORANGE, Calif. — Consolidating nearly all of its voice and data communications responsibilities under one department has improved the overall efficiency of the communications operation at pharmaceutical giant Bergen Brunswig Corp.

The change, which went into effect in June 1986, consolidated voice and data communications services under the supervision of Dyanna Wynn, director of telecommunications and office systems. Wynn reports directly to Anthony Vallario, vice-president of corporate information resources. Previously, voice communications services came under the supervision of Bergen Brunswig's facilities management department.

“The change was designed to help plan and manage the whole communications function,” explained Wynn, who said the move was suggested by DMW Group, Inc., a consulting company in Stamford, Conn. Members of DMW's West Coast office recommended the restructuring as a way of clearly outlining data communications responsibilities.

Recognizing telecom competence

Prior to the change, the telecommunications staff had been simply complying with the data processing department's requests for equipment and carrier services. “It was hard to get them to recognize our competence,” said Bob Schutz, Bergen Brunswig's manager of telecommunications.

A 30-year Pacific Bell Telephone veteran, Schutz oversees a six-person staff and reports to Wynn, whose background is in business administration.

One of the chief outcomes of the restructuring was the elimination of factional disputes about the telecommunications department's duties and goals. “Now the telecommunications department and the data processing department both report to Information Services,” Wynn said. “There is much more teamwork and clearer lines of responsibility.”

Improving the efficiency of the communications operation at Bergen Brunswig was an important goal because the company is highly reliant on communications to conduct its wholesale pharmaceutical business.

Each of the company's distribution centers is equipped with an IBM System/36 and at least one IBM Series/1. The distribution centers are linked to the company

See page 26

GUIDELINES

ERIC SCHMALL

“We sound like that?”

Remember the first time you heard your own voice played on a tape recorder? Most people recall the event with shock: “I sound like that?” Yes, you do. That's the sound you utter without the familiar resonance of tissue and bone that you normally hear reverberating inside your skull. Technology has allowed us to expand Robert Burns' famous dictum. Now it is also a gift to hear ourselves as others hear us.

This lesson shouldn't be lost on the communications manager. He has a similar responsibility to call up and listen to his organization as it sounds to the public. What kind of delays, indignities, frustrations and blockades await the public when it attempts to speak to someone in the company? The manager might ask after a few simple tests, “We sound like that?”

These tests require no sophisticated network hardware or software. Put away the Erlang B tables (at least for now); unplug the datascope; don't worry about NetView for a while. The manager should approach this experiment with the simplicity of his telephone. He is just another caller trying to reach someone in the organization — just like the rest of the world.

The first stop is the private branch exchange operator. How many rings had to occur before an answer? Try it again during the busy hour, when the switchboard first opens and right before closing. Note how long each delay is, and seems. Next, test the operator's official greeting. Does it sound official? What about the operator's tone and enunciation? Now mumble someone's name or department and appear confused. Test your operator's patience and tact. After all, the calling public certainly does.

Assuming you make it past the first line of communications barriers without being appalled or too discouraged to continue, the next level must now be put to the test: individual departments. Listen once again for how long it takes someone to answer the line. Try the same tactics by calling during busy times, the lunch hour and close of business.

Act confused and unclear about who you're trying to contact to test the mettle of secretaries and others who respond at this level. If you encounter a voice mail system intercept, go ahead and challenge it. See if the greeting seems clear and the instructions are easy to follow. Try to escape its embrace and reach a human being again.

Of course, the PBX is just the first obvious jumping-off spot for these tests. If the organization maintains another public interface — such as a Help Desk, claims operation or customer service center — they too are fair game for similar assaults on their integrity.

The results of these probes into the heart of the communications complex should be more revealing than any cold statistics printed off by a PBX. The strengths and shortcomings will be a mixture of technical and human factors that elude the grasp of any diagnostic machinery.

Schmall is network systems manager for an insurance holding company.

Firm blends departments

continued from page 25

data center here via 11 9.6K bit/sec private lines from AT&T, Schutz said.

Bergen Brunswig's 3090 IBM mainframe computer, which is equipped with a 3725 front-end processor, polls the distribution centers each night for sales information and orders.

Bergen Brunswig, a pioneer of Electronic Data Interchange, also transmits invoices and other business forms electronically to suppliers and customers, a practice it undertook in the early 1970s.

Still, according to Schutz, upper management and members of the data processing department were slow to recognize the importance of a professional telecommunications staff.

Depth of technology

"They did not believe we had the same depth of technical background as the data processing staff," Schutz said. His group now supports the data processing department by selecting and purchasing data communications equipment and transmission services.

In addition to supporting the company's distribution network, the telecommunications department provides the billing services and orders the carrier services for all of Bergen Brunswig's 19 divisions.

The network help desk, however, continues to be administered by the data processing department, a situation that will continue at least until IBM develops a network management tool capable of managing the key systems used to support the voice needs of Bergen Brunswig's 51 distribution centers. Currently, NetView and NetView PC cannot interact with equipment smaller than an AT&T System 25, Schutz said.

Winning respect

He said that when the telecommunications group demonstrated that it was best able to choose data communications equipment and negotiate with AT&T for transmission service, it began to win the respect of the data processing department.

Schutz and Wynn said placing the responsibility for data transmission services with the telecommunications staff in a department other than data processing has lessened the historic friction between the data processing and telecommunications staffs.

However, Schutz said upper management continues to exclude the telecommunications staff from the strategic planning process.

Wynn, who oversees the company's office automation operation in addition to telecommunications, said she believes the role of the telecommunications staff will expand as Bergen Brunswig's network evolves.

She said turf battles between data processing and telecommunications have diminished under the new reporting structure. But she added that such friction is an inevitable result of changes in the communications environment.

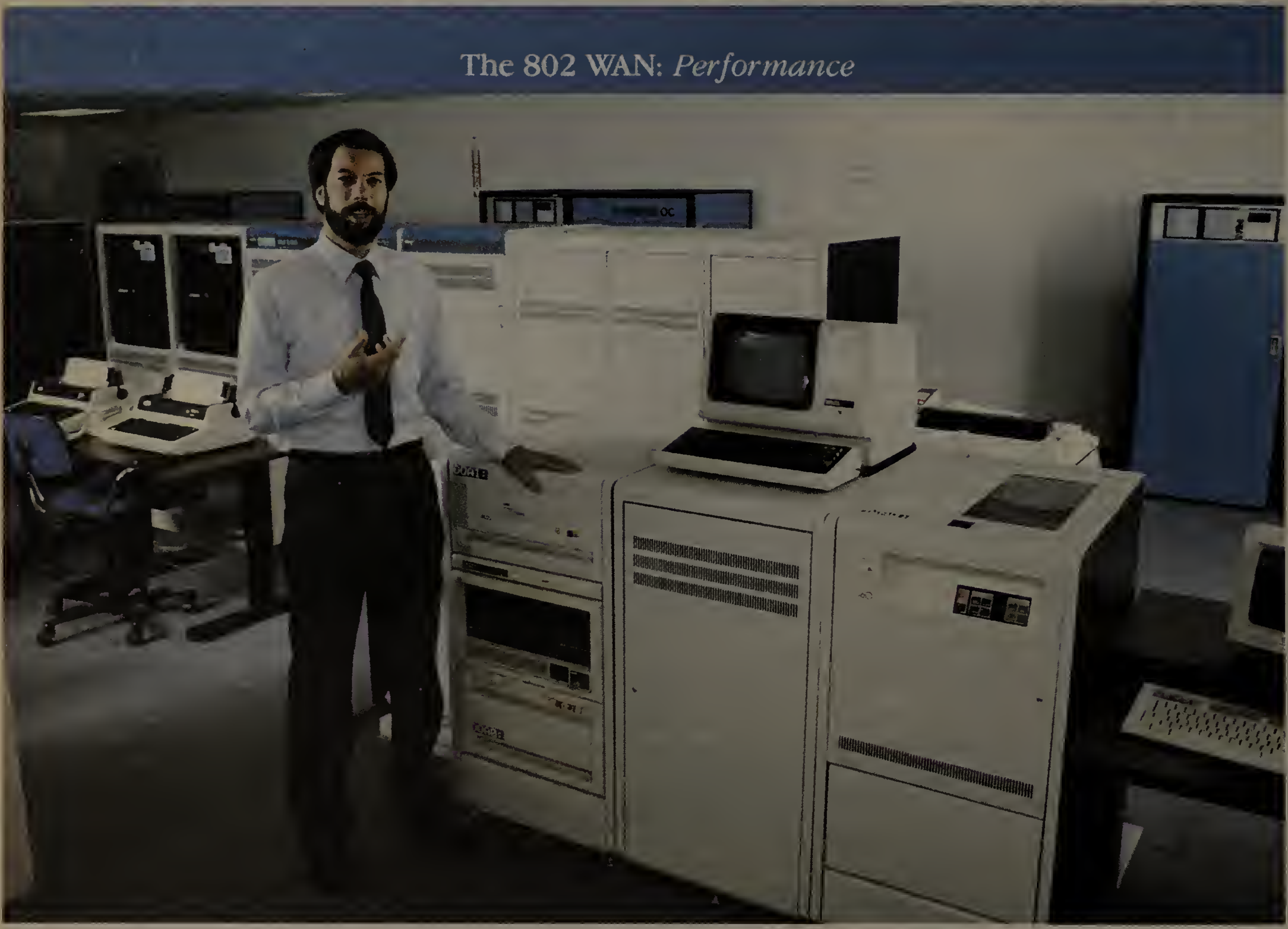
"The changes have helped broaden both the data processing and telecommunications staffs," she said. ◻

Book Review from **page 25**

"If our problems are discussed, we may see that our demands are not the only solution to these problems," Nierenberg writes.

A reader looking for practical information can do best by reading the chapters titled "The Cooperative Process" and "Preparing for Negotiation." These chapters provide specific steps to take in constructing negotiation strategy.

Many of the other chapters, especially "The Need Theory of Negotiation" and "Creative-Alternative Attitudes," are far too theoretical to be useful to the average reader. ◻


The 802 WAN: *Performance*

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—*Jack Covert,* Head, Technical Services, Hughes Aircraft Company

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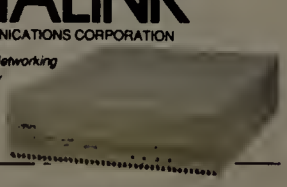
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NEW PRODUCTS AND SERVICES

See inside for:

- ▶Excelan LANalyzer software
- ▶Waterloo Port enhancements
- ▶Raycom's ARCnet I/O module

▶ TERMINAL CONTROLLERS

Rabbit tests end-user mart

BY JIM BROWN
New Products Editor

EAST MALVERN, Pa. — Rabbit Software Corp. entered the commercial market for microcomputer add-on products recently with the release of RabbitCluster, which enables an IBM Personal Computer or Personal System/2 to emulate a terminal controller and support microcomputers, ASCII terminals and IBM 3270-type peripherals.

This product line, aimed at Fortune 1,000 companies, complements Rabbit's selling of software products to computer makers.

RabbitCluster, which includes two personal computer boards and software, enables personal computers, ASCII terminals and existing IBM 3270-type peripherals to link to a mainframe at speeds up to 56K bit/sec. Users may implement one or both of the boards, which are configured via menu-driven personal computer-based software.

The first board, which supports a mainframe link, is dubbed Host Interface Processor (HIP). With an RS-232 Device Attachment Option, the HIP can support up to three ASCII terminals. Those ASCII terminals include IBM's 3101 and 3161, Digital Equipment Corp.'s VT100 and VT220 and other personal computers emulating one of those terminals. In addition to RS-232 links, remote ASCII terminals can also dial into an HIP port.

The other board, dubbed Coax device Interface Processor (CIP), enables up to eight IBM 3270-type A devices to connect directly to the host personal computer. The CIP supports IBM 3178, 3179, 3278, 3279, 3180, 3191 and 3192 terminals operating in IBM Control Unit Terminal (CUT) mode. It also supports IBM's Distributed Function Terminal (DFT) mode, which allows a mainframe to down-line load configuration information to IBM 3194 terminals and 3270 personal computers.

Currently available, RabbitCluster software supports 3174 or 3274 controller emulation and makes attached ASCII terminals appear to the host as an IBM 3270-type terminal. Future software upgrades, planned for release next year, will include a local network gateway version of RabbitCluster, support for IBM's Advanced Program-to-Program Communications and support for X.25 packet switching.

The two-board RabbitCluster set and software costs $2,390. Board or software purchased separately will cost $1,195.

Rabbit introduced a version of its RabbitStation Coax board for IBM's Microchannel architecture. RabbitStation Coax will enable a Personal Computer or Personal System/2 to appear to mainframes as IBM 3278 or 3279 terminals.

The firm released software that enables RabbitStation Coax boards to support CUT and DFT mode. RabbitStation Coax CUT software enables Personal Computers or Personal System/2s to support file transfer and emulate a full 27-row by 132-column 3270 screen.

RabbitStation DFT software enables a Personal Computer or a Personal System/2 to support five 3270 or Remote Job Entry mainframe sessions via an IBM controller supporting DFT. The software will support concurrent 3270 and RJE sessions as well as RabbitScript, which automates operator tasks. The software also features a Local Storage Format, which enables mainframe screens to be stored on the Personal Computer or Personal System/2.

Rabbit also said it will soon release Personal System/2 Microchannel versions of the boards used to support RabbitGate Local-Area Network Gateway and RabbitStation Remote.

Available by year's end, RabbitStation Coax CUT pricing begins at $1,095. RabbitStation DFT pricing starts at $1,295.

Rabbit Software is located in the Great Valley Corporate Center, 7 Great Valley Pkwy., E. Malvern, Pa. 19355, or call (215) 647-0440.

▶ JOINT VENTURES

Granger DS3 mux has drop-and-insert ability

BY JIM BROWN
New Products Editor

SANTA CLARA, Calif. — Granger-Telettra is expected today to introduce a 45M bit/sec DS3 multiplexer capable of supporting drop and insert of DS0, DS1 or DS2 channels.

The firm, a joint venture between DSC Granger Associates, Inc. and Telettra S.p.A. of Italy, is positioning its Digital Drop and Insert 45 (DTI 45) for private DS3 voice and asynchronous data backbone and campus networks using microwave radio, fiber-optic cable or coaxial cable.

The unit's customer interface panel supports up to seven software controlled drop-and-insert boards. Those boards can extract or insert two 64K bit/sec DS0, 1.544M bit/sec DS1 or 6.2M bit/sec DS2 voice or data channels each from a DS3 backbone.

DS1 and DS2 level bit streams plucked from the backbone net are fed to a local multiplexer or channel bank, which breaks down the bit streams into DS0 channels. The extracted channels are passed to local telephone switches or data terminal equipment.

An Alarm Monitor and Control module supplies alarm status to operators, who can use a handheld terminal and keypad to configure the drop-and-insert boards.

According to the firm, to strip a channel out of a DS3 link without a drop-and-insert multiplexer requires demultiplexing the DS3 facility into 28 DS1 streams and feeding them into a channel bank.

That channel bank breaks down the DS1 into 24 DS0 channels. Similarly, the process is reversed to insert a channel. A channel bank assembles DS0 channels into DS1s, which are amassed in order to create the DS3.

The base DTI 45 costs $4,600, and drop-and-insert boards are priced at $1,000 each.

Granger Telettra is located at 3101 Scott Blvd., Santa Clara, Calif. 95054, or call (408) 988-7835.

▶ FACSIMILE INTERFACES

Minis talk facsimile

Biscom board sends, receives faxes.

BY JIM BROWN
New Products Editor

CHELMSFORD, Mass. — Biscom, Inc. recently announced an interface unit that enables minicomputers to communicate with facsimile machines and send and receive documents.

The Faxcom 2000 minicomputer-to-facsimile interface is available for Convergent Technologies, Inc.'s S series of minicomputers and Tandem Computer, Inc.'s NonStop II series. The firm is working on versions for Digital Equipment Corp.'s VAX, Wang Laboratories, Inc.'s VS and IBM's System/36 and System/38 minicomputers.

Faxcom 2000 complements Faxcom 1000, which enables IBM Personal Computers, Apple Computer, Inc.'s Apple IIe and Macintosh microcomputers and AT&T's PC 6300 to send out and to receive facsimiles.

With Faxcom 2000, a minicomputer can receive incoming facsimile documents, store them on a disk, transfer them to another facsimile or redirect them to a laser printer for printing.

The product enables minicomputer terminal users to send a document via facsimile by using a standard print command. It will queue outgoing facsimiles and enable users to schedule transmission times.

The Faxcom 2000 will also support error reporting to the minicomputer.

Faxcom 2000 supports communications with CCITT Group III facsimile equipment over dial-up lines. The interface board links to the minicomputer via a serial or parallel printer port.

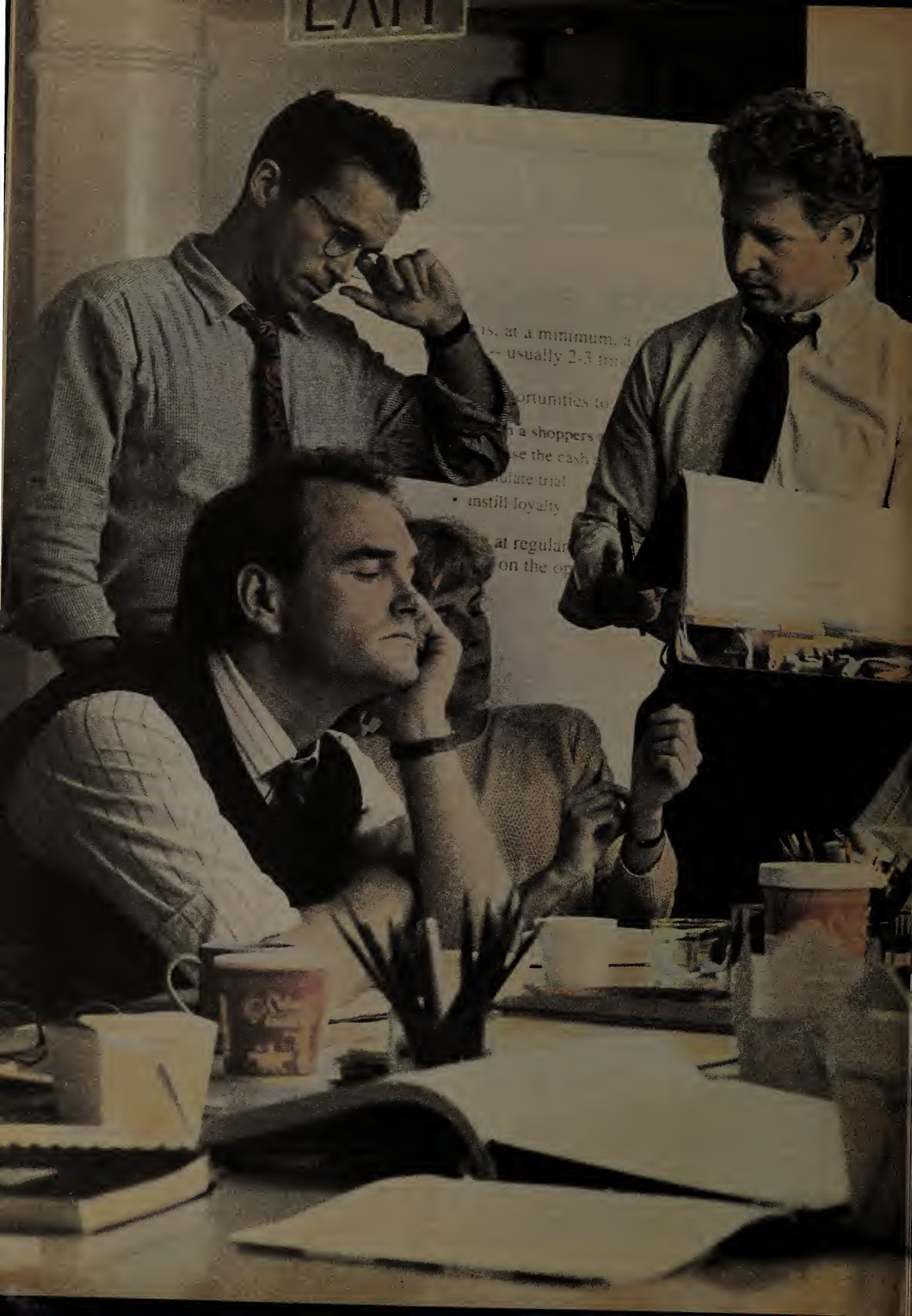
Faxcom 2000 features an autodial capability that enables a single document to be sent to multiple locations. To accomplish this, users list the numbers of the receiving facsimiles at the top of the facsimile pages.

The product also reportedly automatically inserts a signature or company logo on outgoing facsimiles.

When not used as a facsimile interface, the product can act as a print buffer supporting up to 50 pages of printer output.

Faxcom 2000 is priced at $4,995. Existing Faxcom 1000 products are $2,495 each.

Biscom, Inc. is located at 2 Courthouse Lane, Chelmsford, Mass. 01824, or call (617) 441-0010.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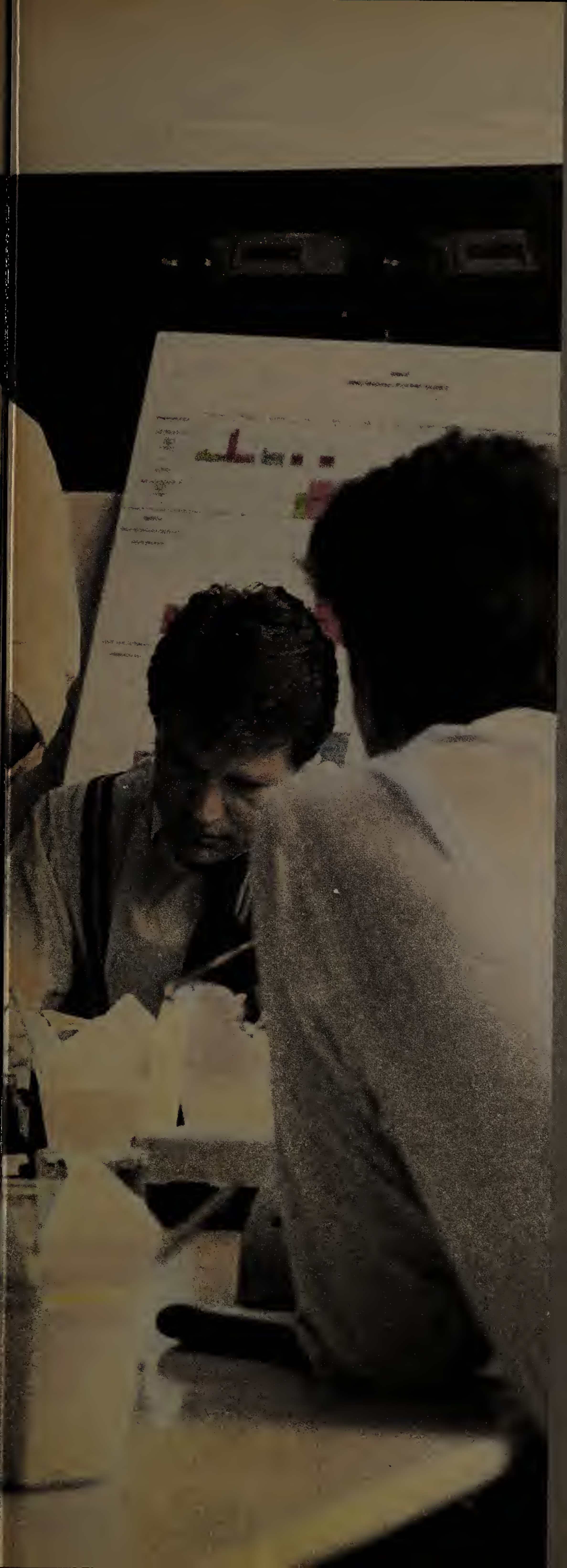

“In the good old days, there were no free lunches. But a lot of free dinners.

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Software upgrade packages make it just as easy to add features – AT&T's AUDIX message-recording system, for example – or to use System 75 as the hub of a company-wide network.

To learn more, contact your AT&T Account Executive. Or call 1 800 247-1212.

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First Look

Excelan enhances its LANalyzer software

Excelan, Inc. released personal computer software that monitors and tests local-area network protocols.

The firm's **EX 5300** runs on an IBM Personal Computer AT linked to an Ethernet local-area network via an Excelan EXOS 325 controller. It provides mirror images of data packets transmitted over networks supporting Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network System, Transmission Control Protocol/Internet Protocol and other network protocols based on the International Standards Organization's Open Systems Interconnect model.

The package's real-time station monitor intercepts data packets from up to 1,000 network nodes and displays them on screen in real time. Excelan offers a software library for the EX 5300 that provides users with preformatted protocol test routines.

The firm also released the EX 5500 version of the package that comes with a Compaq Computer Corp. portable computer supporting 640K bytes of random-access memory and a 20M-byte hard disk. In addition, the firm provides a version of the software that supports AT&T's Starlan network.

Excelan also released the **EX 5100,** a repackaged version of its existing LANalyzer software.

All three new packages are available immediately. List price for the EX 5300 is $9,550, and the EX 5500 is $15,000. The EX 5100 package is $4,950, which is 48% lower than the earlier LANalyzer product.

Excelan, Inc., 2180 Fortune Drive, San Jose, Calif. 95131, or call (408) 434-2226.

Waterloo releases Port enhancements

Waterloo Microsystems recently introduced several enhancements to its Port local-area network.

The firm's recently released Port operating system Version 2.41 will now support a broadband version of Waterloo's **Backbone Internet Gateway** software, which enables separate Port local nets to be connected via a broadband-based backbone network.

A Port-attached device running the new software and equipped with an Allen-Bradley Co. Vista-LAN/PC Network Interface Module will transmit messages destined for a similarly outfitted device on another Port local net via a single broadband channel. The broadband gateway will support links between as many as 255 separate Port local nets.

The firm also released **Port Internet Mail,** which enables users on one Port network to exchange electronic mail with users on another Port network. One device on each Port network is configured to support mailboxes for other devices on its network.

The mail center software will run in background, freeing a personal computer to perform other tasks.

The mail center receives messages from other devices on the same network or from other networks. It will either forward the message to the receiver or hold it in that user's mailbox until it can be retrieved. The software will support mail messages with an attached document of up to 4G bytes.

The company also released **Port SNA Server** software that enables a Port-attached personal computer to emulate an IBM 3274 Model 51C terminal controller. The software supports a 19.2K bit/sec Synchronous Data Link Control link to an IBM host in an IBM Systems Network Architecture environment.

The new software makes Port-attached personal computers appear to the host as IBM 3278s or 3279s. It supports up to 32 concurrent host sessions and enables personal computer users to toggle between multiple terminal sessions.

Available in February, the broadband Backbone Internet Gateway software needed to link two remote Port local nets via broadband will sell for $2,595. The cost to link additional local nets via broadband will be $1,495. Available in December, Port Internet Mail software will sell for $795. Also available in December, Port SNA Server software costs will range from $3,100 for an eight-port model to $5,500 for a 32-port model.

Waterloo Microsystems, 3597 Parkway Lane, Suite 200, Norcross, Ga. 30092, or call (404) 441-9252.

Board enables fiber mux to bridge ARCnets

Raycom Systems, Inc. introduced a board that enables its 5100 Series Fiber-Optic Multiplexer to act as a bridge for remote ARCnet local-area networks located up to 33,000 feet apart.

The firm's **ARCnet I/O Module**

See **Raycom** page 33

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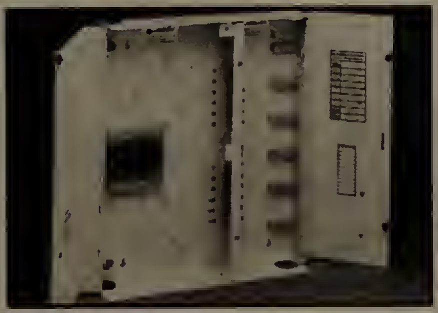

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Raycom from **page 31**

supports two half-duplex channels operating at up to 2.5K bit/sec. The new board supports the ARCnet data stream and does not require any hardware or software modifications to the ARCnet network.

The ARCnet I/O Module provides ARCnet signal retiming for ARCnet devices linked to it via a coaxial cable that can be up to 2,000 feet long.

With the module and multiplexer, ARCnet local net-attached devices in one building can communicate with ARCnet-attached devices in another building.

Raycom's 5100 multiplexer can host two ARCnet I/O Modules capable of supporting up to four ARCnet networks. The larger Raycom 5110 multiplexer can host four ARCnet I/O Modules capable of supporting eight ARCnet local nets.

The ARCnet I/O Module is priced at $1,800.

Raycom Systems, Inc., 6395 Gunpark Drive, Boulder, Colo. 80301, or call (303) 530-1620.

Pack provides standard PC-to-host software interface

Simware, Inc. recently released a communications and file transfer package that creates a standard software interface for users of micro-to-mainframe link hardware.

With **SimPC Master,** personal computer users who link to a mainframe via 3270-emulation boards, local-area network gateways, protocol converters and X.25 packet links will view a single menu-driven software interface.

The package, for example, will replace the software supplied with IBM's 3278/79 Emulation Adapter board and Digital Communications Associates, Inc.'s Irma board.

The package includes IBM host and personal computer components. The host components support IBM MVS, VTAM and VM sites.

SimPC Master personal computer-based software links to the host component to enable the personal computer to transfer data files with host-based CICS, TSO and CMS applications. The new product also enables users to upload and download virtually any personal computer DOS file.

SimPC Master features Simware's new Advanced Modular Architecture (AMA), which will enable the company to add support for IBM's Advanced Program-to-Program Communications to future versions of the product. AMA will also let Simware add a Server Requester Protocol Interface to future versions.

The vendor said the new product supports such communications protocols as Xmodem and Columbia University's Kermit.

Available immediately, the host component costs between $5,000 and $10,000, depending on operating system. The personal computer-based component lists for $325. Multiple copy licenses are also available.

Simware, Inc., 20 Colonnade Road, Ottawa, Ont., Canada, or call (613) 727-1779.

GammaLink introduces PS/2-to-fax board

GammaLink, Inc. recently announced a personal computer-to-facsimile communications package for the IBM Personal System/2.

The company also revealed plans for the development of a new product line to provide remote communications capabilities for the computer-aided design, manufacturing and engineering industries.

The **GammaFax Microchannel (MC)** offers the same personal computer-to-remote facsimile transmission and high-speed personal computer-to-personal computer file transfer for the Personal System/2 as is currently available for IBM Personal Computers.

The MC system, which consists of a board and menu-driven communications software, allows users to send documents directly from a Personal System/2 to any digital facsimile device.

A DOS file may be sent over dial-up telephone lines at up to 9.6K bit/sec. The same is true for Personal System/2-to-Personal System/2 file transfers.

GammaFax MC features advanced background capability, which provides concurrent processing to allow users to receive incoming facsimiles while using their Personal System/2s for other tasks.

GammaLink's new product line, to be introduced in the first quarter of 1988 under the name **CAD-Fax,** will enable users to send any design-related information via dial-up telephone lines to other CAD-Fax equipped computers, Hayes Microcomputer Products, Inc.-compatible modems or any CCITT Group III facsimile machine.

Based on the GammaFax product, CAD-Fax products will support a variety of industry graphic standards. The vendor said CAD-Fax users will be able to transmit any computer-generated design data, including drawings, plots, estimates, schedules, parts lists and bills of materials.

GammaFax MC is priced at $995, as is the standard GammaFax, and will be available in January 1988. Pricing for CAD-Fax products has not been set.

GammaLink, Inc., 2452 Embarcadero Way, Palo Alto, Calif. 94303, or call (415) 856-7421. ◘

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LOCAL NETWORKING

ANDRES LLANA

The LAN gateway dilemma

Local-area networks provide managers with the opportunity to place minimally configured personal computer workstations on users' desks while letting them share more expensive peripherals.

Almost no one starts out that way, however. Usually, it's the other way around: Most users think about local nets only after they're faced with a proliferation of personal computers and expensive peripherals.

The object of a local-area network is to make more effective use of the user's personal computer resources. Unfortunately, most local nets don't reach their full potential until they've been configured with a gateway that lets users exit to other local nets and other systems, such as mainframes. Therein lies a problem for some established users, who must dedicate their heavily configured personal computers as gateways.

Before integrating their personal computers into a local net; many users don't give much consideration to issues relating to net configuration and functional structure. During the net implementation process, therefore, these users may be surprised when many of their fully configured personal computers become dedicated to net-related functions, and the personal computer's resources are no longer available.

This is particularly true when newly networked personal computer users still require access to a mainframe. The net manager soon finds that some personal computers must be surrendered for service as dedicated file servers, print servers and gateways.

A personal computer may be set up as a multifunctional gateway, which provides access to more than one local network or computational resource, such as a mainframe. But if the gateway software supports both local net and mainframe access, for example, users soon find that usable random-access memory is eaten up by RAM-resident software and associated buffering requirements. The personal computer is unable to support more than one gateway and may be useless even as an alternate workstation.

The local network software can demand up to 80K bytes of active memory, while the basic requirement for the MS-DOS operating system is 30K to 35K bytes of RAM. When users add the needs of the multifunctional gateway server software, an additional 164K bytes of RAM may be used up. The gateway server, overloaded with operational software, can no longer serve as a workstation.

The personal computer can serve as a basic gateway connecting to one other environment but can't serve as both a mainframe gateway and a connection between local nets, due to the lack of machine resources.

Another alternative users have is to implement the gateway function in hardware via a multifunction board. Numerous local net gateway function boards on the market support multifunctional gateways, and they don't use up personal computer memory as current software solutions do. However, these solutions require adding expensive hardware that overlaps functionally with the user's current emulation boards.

For example, users whose personal computers are equipped with Irma cards are faced with a dilemma. They can either discard their emulation board in favor of buying still another function card, or they can seek a software solution that will dominate the resources of the personal computer.

So far, the software solutions now on the market that are aimed at supporting a multigateway function use too much memory. There is currently a need for more efficient software products that not only support multifunctional gateways but also can interface with all existing local net server software offered by the major local net vendors.

If local networks are to become the cost-effective networking solution they are in theory, then new software solutions will be required. There will always be purveyors of hardware solutions; however, if the concept of local networking is to become as popular as it can be, then new vendors will have to emerge, with a renewed interest in the software side of local net development.

The current situation presents a dilemma to users that don't wish to scrap older, proven emulation boards for other gateway boards. In addition, users installing personal computers should think in terms of their future plans for network access and their possible involvement in local nets. These users should give careful consideration to current and future system configurations to ensure that they don't develop a series of incompatible terminal arrangements.

Llana is director of consulting services for the Vermont Studies Group, Inc. of West Dover, Vt.

DISTRIBUTED PROCESSING

JAMES G. HERMAN

Big Blue shifts gears

The enhancements to NetView announced by IBM over the past six months indicate that Big Blue is preparing for a shift to distributed processing for its major business applications.

As always, IBM is aiming to put itself in a position of control. In its ongoing wrestling match with Digital Equipment Corp. and other suppliers of mid-range computers and workstations, IBM expects to at least end up on top, even if it might not remain overwhelmingly dominant.

The steady decline in the cost of computer power and the maturation of low-end operating systems and application software will soon make it possible to build critical business applications using a distributed architecture. IBM's Personal System/2 Model 80 has approximately the same number of million instructions per second as the System 370/168 of the mid-1970s, which in its day was considered a top-of-the-line platform for big applications.

Personal computer and workstation operating systems are beginning to offer multitasking and integrated communications protocols. Network file systems are making it easy to share data among distributed users. Servers based on low-end minicomputers such as DEC MicroVAXes and NCR Corp. Towers, as well as those developed by 3Com Corp. and Novell, Inc., are becoming familiar components of work-area as well as departmental networks.

Distributed data base systems allow flexible management of data across multiple low-end, mid-range and high-end systems. The capabilities are here, and the economics will soon make it hard to justify building a new application on a mainframe base.

However, there are serious obstacles to abandoning today's mainframe-based model of application development.

First, there's the lack of expertise in how to design and implement distributed systems. The current generation of developers has been trained in the standard centralized method, yet they must now answer questions related to the control and operation of distributed systems.

Will operators be required at every site? How can errors and bugs be detected and corrected in a distributed environment? Entirely new approaches to capacity planning and performance analysis will be needed. How will software be released and configuration consistency maintained? How can new versions of operating system and application software be tested and validated without degrading production operations?

The answers to these questions lie in the experience and technology gained over the past 20 years in developing and operating distributed communications networks. The centralized, remote operations techniques that were pioneered in large packet networks provide the approach for managing tomorrow's networks of distributed processors and workstations.

Needed will be the ability to download software, centrally control configuration start-up and then receive real-time notification of alarms and thresholds on a remote display console. These techniques allow scarce resources, such

Herman writes, teaches and consults on telecommunications technology in Cambridge, Mass.

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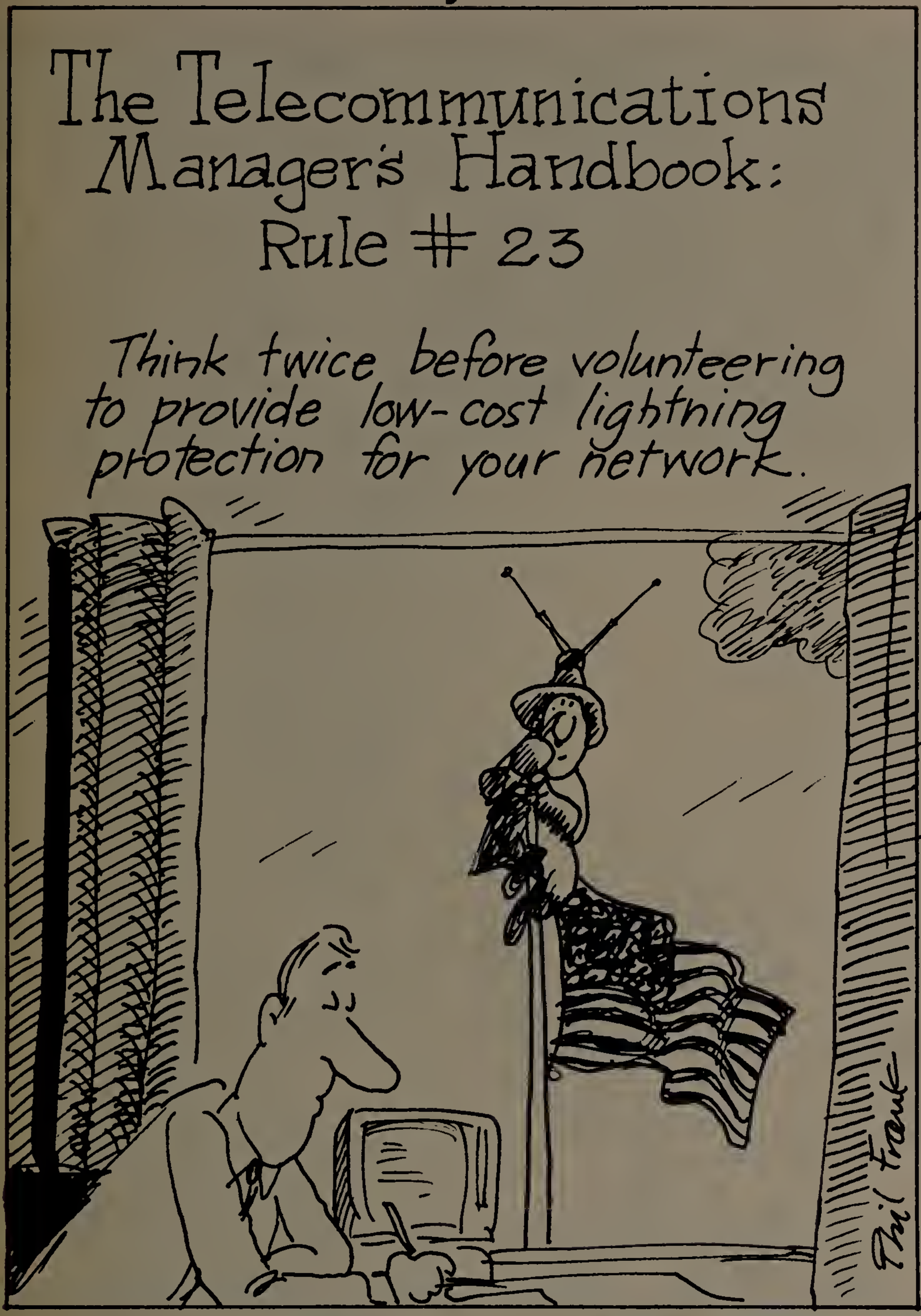
Contact Steve Moore, features editor, *Network World,* Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 732.

▶TELETOONS — By Phil Frank


The Telecommunications Manager's Handbook: Rule # 23
Think twice before volunteering to provide low-cost lightning protection for your network.
Phil Frank

as human experts, to be pooled and used more productively.

They also keep operations and administrative costs from growing in proportion to the network. Most importantly, they provide a global view of the computing and communications resources that span the boundaries of individual systems. And that's crucial for effective problem determination and resolution.

Recent NetView enhancements extend its purview to operating system software and collections of remote processors such as 9370s. Unattended operation of remote systems and downloading of software are key steps in centralizing operations of a decentralized computing base. IBM is integrating management of the network with management of remote processing and is setting the stage for NetView control of the distributed applications of the next decade.

There is some irony in the possibility that operation and management of large networks consisting of small distributed processors might become a major mainframe application of the 1990s. Is this IBM's answer for what to do with the mainframe? Perhaps, but it's clear that network management systems themselves must submit to distributed design approaches.

Multiple small processors located at various sites around the network must be able to perform the network management function. Total centralization of operations must give way to cooperative network management, in which multiple sources of information and expertise are combined in order to solve communications and processing problems.

It's now more important than ever for application designers and network analysts to develop a common architecture for future development. The boundary between these two functional areas is blurring. Further, the quality and effectiveness of the next generation of distributed applications will depend in large part on the ability to integrate into them the knowledge and experience of distributed networking.

Meanwhile, vendors that want their products to be the base for these new applications must address the problems of cost-effectively managing the resulting combination of processing and communications functions. ◻

EDITORIAL

Users groups should merge

Consider the possibility of merging the Tele-Communications Association (TCA), the Association of Data Communications Users (ADCU) and the Communications Managers Association (CMA) into one national users group. There are some compelling reasons for such a union.

At a time when user input is critical on such issues as the development of Open Network Architecture, computer compatibility standards and a host of regulatory affairs, a TCA-ADCU-CMA troika — call it the Communications Users Association (CUA) — could have a strong influence on the future development of these issues.

Such a union would dovetail nicely with TCA's already announced intention to expand to a national level. The group currently has 1,000 member companies and 2,500 individual members, most of whom are spread throughout the western U.S.

However, members in states outside TCA's western core region don't have their own chapters, which means they participate in TCA in a marginal sense at best.

Growth goals

As a group, ADCU — with its 240 member companies and 275 individual members — also aspires to nationwide status. However, ADCU seems largely driven by longtime leader August "Augie" Blegen, who shouldn't be counted on to go it alone forever.

Member activism within ADCU could use the boost that affiliation with TCA and CMA would provide. Currently, the association has only four regions that hold regular meetings: New York, New Jersey, Boston and Minneapolis-St. Paul.

CMA, with 208 member companies and 500 individual members, counts among its ranks many communications managers from large New York-based companies. They could share a wealth of experience with other CUA members, many of whom work at smaller companies.

CMA is distinguished from TCA and ADCU in that it requires member companies to have yearly communications budgets of $1 million or more.

In an effort to attract more visitors and raise its profile within the industry, CMA is considering moving its annual conference and exposition from Long Island, N.Y., to nearby New York.

Strength in numbers

The combination of these three groups could strongly influence the course of legal and regulatory events. Together, they could lobby in Washington, D.C. on regulatory issues affecting users. Separately, none of the three groups can wield the influence on Capitol Hill or at the Federal Communications Commission that they would gain if united.

The International Communications Association (ICA) lobbies the Washington scene, offering valuable input on regulatory matters. But ICA, by its own admission, does so in a conservative fashion. Users need stronger, more persuasive representation that will hit hard in Washington and at the state level as well.

Together, CUA and ICA would comprise a powerful user coalition representing a complete spectrum of users and their concerns. Rather than compete, the two users groups would complement each other.

The big picture favors the creation of CUA, but there would be many thorny organizational issues to iron out. TCA, with more than twice as many member companies and three times as many individual members, could dominate elections, and thus leadership power, if the new group were allowed to split along factional, pre-CUA lines. Provisions would have to be built into the CUA charter to prohibit such factional domination. For example, guarantees that all three subgroups have representation at the national leadership level could be incorporated.

In order for this proposed union to become a reality, the three groups would not have to sacrifice their current identities totally. All three could continue to have their separate annual trade shows, but each would be held under the CUA banner. And each would be enriched by speakers and attendees from the other two groups.

TCA, ADCU and CMA each have a lot to gain by getting together. These organizations have much less to gain by remaining separate. And they have nothing to lose by discussing the possibilities. ◻

Special Section: Factory communications

NETWORK WORLD

Features
November 16, 1987

Mike Kaminski's MAP of the world

MAP's godfather speaks out on GM, Ethernet and MAP 3.0.

Continued from page 1

Open Systems Interconnect (OSI) networking model, MAP has become a worldwide de facto standard for large factory networks.

As MAP program manager, Kaminski guided the design and development of MAP through each phase of its evolution. He is a driving force within the North American MAP/TOP Users Group, working with group members and international standards organizations to help ease the introduction and acceptance of MAP worldwide.

Network World *Assistant Features Editor Bruce Guptill recently spoke with Kaminski, who recounted his last eight years of effort and looked forward to next year's MAP 3.0 demonstration.*

Recently, the MAP/TOP Users Group announced there should be no changes in MAP specifications for the next six years. Why is that?

What we said was that Version 3.0 is to be in place for six years. We said that for the first six months after its release, the only changes allowed would be error corrections.

I think people want to ensure that we add functionality, and we've got to because nothing sits still. For example, the Manufacturing Message Standard [MMS], which the vendors themselves declared probably one of the most significant items in this whole effort, is very skeletal.

We've got to add functionality to that as it emerges into an international standard.

And there are what we call the companion standards. For example, MMS is a base standard, but each type of device in a factory network has its own standard that's going to be incorporated into MMS. The inclusion of these companion standards could become MAP Version 3.1, because you wouldn't want to confuse vendors.

And we said we would review things like that once a year. That would imply the earliest we could incorporate anything new into the specification would be sometime in 1989.

So it's the framework that's complete, and you're filling it in from there?

Yes. The base functionality is there; we're embellishing it. With the 3.0 demonstration, it will be approximately 85% complete.

Where is the demonstration scheduled?

In Baltimore, June of 1988. We're going to have approximately 55 vendors in eight on-the-floor booths sponsored by users. One of the booths is sponsored by

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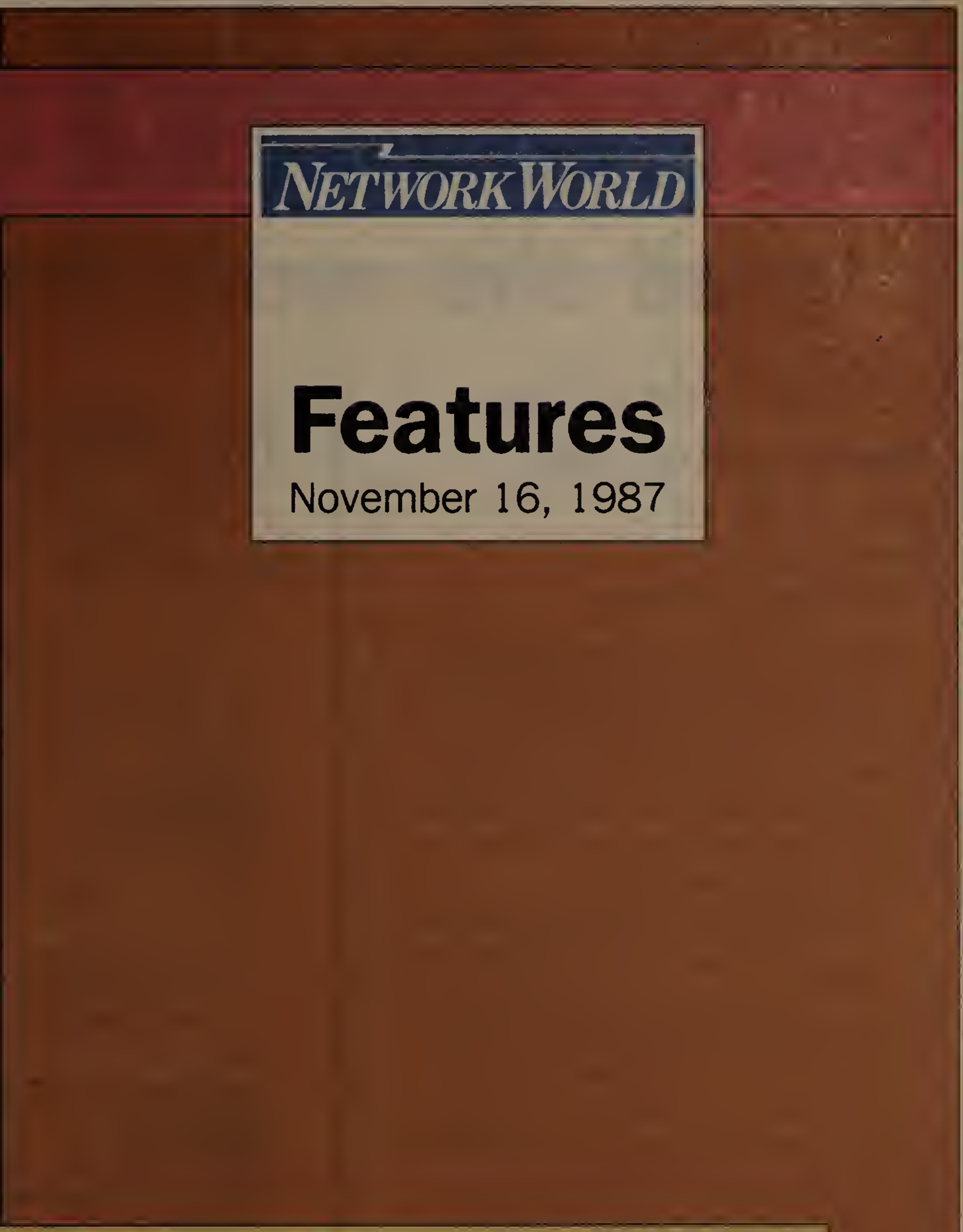

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Dr. John McQuillan, President, McQuillan Consulting

This intensive, one-day seminar instructs you on planning issues for integrating packet, circuit, and channel switching; SNA and X.25; and voice and data in a corporate network strategy. You will address the role ISDN will play, as well as enterprise-wide networking and bandwidth-intensive applications. **Level:** Intermediate.

T-2 MULTIVENDOR/MULTIARCHITECTURE LANS: MAKING THEM WORK

Dr. Kenneth Thurber, President, Architecture Technology

Attend this tutorial for a comprehensive overview of today's LAN environments. Discussion will include how to tie diverse and often incompatible network elements together in a manageable, logical way, as well as alternatives to LANs. **Level:** Advanced.

T-3 ISDN: STANDARDS, PRODUCTS AND SERVICES

James G. Herman, Independent Consultant, and **Mary Johnston,** Senior Consultant, Telecommunications Consulting Group at BBN

ISDN is fast approaching. Some say with too little agreement on fundamental standards and applications. Attend this highly focused, intensive session to anticipate the emerging standards, vendor trials, conflicts, successes, products and service offerings that will emerge over the next several years. **Level:** Intermediate.

T-4 MULTIVENDOR NETWORK MANAGEMENT

Jerry McDowell, Vice President, Vanguard Telecommunications Inc.

Enroll in this intensive tutorial for skills in how to manage a network which links multiple carriers and a variety of hardware and software vendors in one corporate network. You will learn how to take control into your own hands and avoid finger pointing, acrimony and poor service. **Level:** Intermediate.

T-5 HOW TO BECOME A BETTER TELECOMMUNICATIONS MANAGER

Gerald P. Ryan, President, Connections Telecommunications Inc.

Today's network manager must not only understand new technologies and standards, but must also play many roles in the company. Attend this instructive tutorial for an entertaining and thought-provoking look at what you need to know to be a successful network manager, plus the tools, processes, and organization that will maximize your efficiency. **Level:** Intermediate.

T-6 THE LATEST LOOK AT NETWORK STANDARDS AND OSI

Richard desJardins, Director of Technology R&D, Computer Technology Associates Inc.

As OSI and the older standards are reaching maturity, numerous new standards are in the works. Attend this intensive session for a look at the new generation of standards — including their purpose, significance, applications, and technical elements. **Level:** Introductory.

T-7 MODELING AND DESIGNING DATA AND INTEGRATED NETWORKS

Dr. Wushow Chou, Professor of Computer Science and Electrical and Computer Engineering, North Carolina State University

Enroll in this tutorial for detailed instructions on how to design integrated networks. You'll learn about combining voice and data on a single architecture to maximize the efficiencies of wideband services, the migration from classical multipoint to distributed systems, plus cost-efficiency issues and other practical considerations. **Level:** Advanced.

T-8 IBM NETVIEW: INDUSTRY WIDE IMPLICATIONS

Atul Kapoor, Vice President, Kaptronix Inc.

This tutorial gives you a thorough and comprehensive introduction to IBM's NetView and NetView/PC — their operation, technical specs, dependencies and functional interactions, plus an analysis of their impact on the industry, significance for users, and practical suggestions for implementation. **Level:** Intermediate.

T-9 OPEN NETWORK ARCHITECTURE: CARRIER/VENDOR/USER IMPLICATIONS

Haines Gaffner, President, LINK Resources Corp.

The FCC has ordered AT&T and the RBOCs to adopt ONA to stimulate competition in enhanced data processing services over public switched networks. Enroll in this tutorial to learn the details of the ruling, its implications for service offerings and an overview of who the players will be. **Level:** Intermediate.

T-10 INTERNATIONAL NETWORKS: SOLVING THE PRACTICAL PROBLEMS

Len Elfenbein, President, Lynx Technologies Inc.

Attend this tutorial if your company is expanding its network outside the U.S. You'll receive immediately useful information on tariffs, rules, how to handle ordering and service delays, the role of the PTTs, how to deal with the lack of consistency from country to country, and many more issues you must confront to succeed. **Level:** Intermediate.

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T-11 BUILDING THE NETWORK CONTROL CENTER
Gabe Kasperek, President, Kazcom Inc.

This one-day course will help you successfully operate a network control center on a day-to-day level. You will focus on the practical requirements, functions to be performed, systems and tools available and how to put them all together to gain control over your network. **Level:** Introductory.

T-12 REGULATORY ISSUES AND ANSWERS
Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social, and regulatory issues, the evolution of vendor technology and industry standards, and significant developments affecting the coming regulatory year. **Level:** Intermediate.

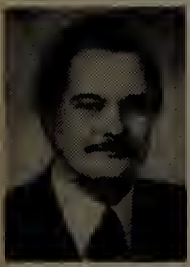
T-13 INTRODUCTION TO DATA COMMUNICATIONS
Gary Audin, President, Delphi Inc.

This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry. **Level:** Introductory.

T-14 INTRODUCTION TO VOICE COMMUNICATIONS AND PBX
James Morgan, Principal, J.H. Morgan Consultants

Enroll in this full-day tutorial for a comprehensive foundation in the basics of voice communications — technology, PBX characteristics, switched networks, tariffs and services, as well as an overview of traffic engineering. **Level:** Introductory.

T-15 IMPACT OF THE NEW POST-DIVESTITURE TARIFFS ON LARGE NETWORKS
Robert L. Ellis, President, The Aries Group



In this intensive tutorial you will learn the structure of the post-divestiture tariffs, the latest January 1988 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics in configuring data networks, the LATA-pure strategy and federal access tariffs and how to use them. **Level:** Intermediate.

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the Department of Trade and Industry from England. Another booth, which is off-site, is on the factory floor at British Aerospace [plc] in England, connected via an X.25 interface.

What we're trying to do is demonstrate enterprise networking. We believe there's a communications standards requirement for manufacturing. And there's another one, TOP, that encompasses offices, engineering, data processing and word processing areas. That will be much more massive than MAP. TOP will pick up things like graphics, data exchange and X.400.

> "TOP encompasses offices, engineering, data processing and word processing areas. That will be much more massive than MAP."

The event is intended to show internetworking. We've got eight booths with what we call a 'global application.' We'll demonstrate MAP from order entry to the design phase, to engineering, out to subcontractors and then, finally, the finished product will come out of the last booth, which is ours.

In the GM booth, we're building a product. In the Boeing [Co.] booth, they're doing the order entry. In the Aerospace booth, they're doing design work. In the Deere [& Co.] and TRW, [Inc.] booths, they're doing something else. They're doing functional work in the booth in England.

Tied together, it shows enterprise networking. These different functions that occur in different locations are linked together with MAP 3.0.

How are outside devices and wide-area nets communicating with MAP?

Through routers. We use the PBX switches to do that at the events. We're going to demonstrate messaging with an 802.3 network, using the X.400 standard.

We're also in negotiations with a group of about 20 vendors who have formed a consortium called Seven Limited. We think there will be between 10 and 15 of them setting up a peripheral booth in London that would be kind of an extension to the MAP demonstration. The Corporation for Open Systems booth is going to contain 10 to 12 large COS vendors, demonstrating the ability to link, via X.25, to Seven Limited.

Will MAP 3.0 be commercially available at the time of the upcoming announcement?

That's up to the vendors. We certainly hope so. I would suspect some will, some won't. Right at the event, they'll say, 'We've got a product. Want to buy it?' But I think some of them will say it'll be ready in two, three or four months or whatever.

If you look at it from the standpoint of the user, he's not going to use MAP 3.0 the day after he walks out of that show. For example, we want to use it for GM's Saturn Project, which will be on-line in the very late fall of 1988. So we're talking about June to November. That's the target date.

Is the success of MAP tied to OSI?

Yes, eventually OSI is going to prevail. It's going to take a long time, especially in the case of IBM because they've got a tremendous base out there and it's going to be slow for the customers to go over to OSI technology.

I think you'll see a big surge to OSI, then it will slow down, and you'll see a big surge again. Over a 10-year period, you'll see two or three of those surges as new things come out. I think that in 10 years, the country will be totally OSI.

> "I think you'll see a big surge to OSI, then it will slow down, and you'll see a big surge again . . . in 10 years, the country will be totally OSI."

Is TOP seen as sort of the stepbrother of MAP?

Yes. I think you won't really see that changing until you see more successful implementations of MAP in place.

So, MAP should come first?

The reason it should come first is because it's been ongoing for some time, and a lot of vendors have participated. What the world is waiting to see is success with standards. As that success is demonstrated, they're going to say, 'Well, even though TOP is bigger and more complex, it's a given. We succeeded once, it'll be easy to succeed a second time.'

Sooner or later, Integrated Services Digital Network will be here. How will GM's MAP/TOP project fit in with it?

We believe it will be sooner. We're already making the investment in plant and equipment; we're going to have a huge network. [Electronic Data Systems Corp.] is going to run our private network, but I'm sure we're going to sell some capacity. And if other companies can't provide ISDN, people can buy our services across the world.

The reason I say sooner is because the very large wide-area communications-type companies are a little tired of us concentrating our standards on computer companies. And they want a piece of the action.

ISDN is extremely necessary to link everybody up worldwide.

How involved has EDS been with the MAP project?

In the MAP/TOP effort, EDS doesn't do development work unless they get paid for it. They're our implementation arm. They worked on Truck & Bus [the GM truck and bus plant in Pontiac, Mich.] with us, and now we feel we can hand that technology over and be consultants, if necessary, as we make this transition to 2.2 and 3.0. The MAP 3.0 implementation will be under the guidance of our manufacturing people, but EDS will do the work.

Have you been working with GM Hughes Electronics?

Yes, Hughes did some of the work at Truck & Bus. The beauty of Hughes is that they're used to real-time needs. The people have been extremely capable. They're a very real part of this, and we're working with them now.

So, is GM a MAP user, vendor or developer?

GM is certainly a user. In the case of EDS, GM is a vendor, but EDS is not going to supply MAP. EDS is going to supply integration services. They will implement MAP.

I'm sure Hughes is not only going to use MAP but will probably sell it. I'm sure Hughes will use it in some of their defense contract business. The government is going to specify ISO [in contracts].

We're certainly a developer. We've been leading that effort right along, and we're going to continue to do that.

> "It'll cost a little more . . . But it's a hell of a lot easier to go from MAP 2.1 or 2.2 to 3.0 than it is to go from any proprietary system to 3.0."

We're also trying to push the North American MAP/TOP Users Group into more of a permanent organization that has more financed participation by other organizations.

How will the Pontiac Truck & Bus plant experience be translated to these new installations?

We are working extremely closely with the Saturn people. I've got two people assigned to that effort, and some of the EDS people who worked on Truck & Bus are also working on this. And we certainly expect some of the Hughes people to participate.

We've been implementing carrier-band MAP at two other GM plants now, and because there is some portability — not totally, now, we're working toward that — we'll be able to take some of that over to Saturn.

Theoretically, it shouldn't be that difficult, but there is a transition from existing MAP technology to MAP 3.0. We're working with nine of our plants right now, bringing up the technology before the 3.0 products are available. Plant management is installing carrier band, with the 2.2 technology on it; 2.2 is 2.1 on a different medium. The plants will be able to install 3.0 capability later, with a minimum amount of transition problems.

It's not like you just plug one into the other. There is some work that has to be done, and it'll cost a little more. But it's a hell of a lot easier to go from MAP 2.1 or 2.2 to 3.0 than it is to go from any proprietary system to 3.0.

What are your relations like with outside vendors?

I've watched companies go through the stages of saying, 'We'll sell MAP *and* our proprietary technology. For those customers that want this, we'll have it available. We won't handle it the same way we handle our main line, but we'll do it.'

As the MAP demonstrations took place, more and more of this sort of attitude fell by the wayside.

Who are the vendors you've participated with most closely?

IBM has participated in all our events, along with DEC and [Hewlett-Packard Co.]. Honeywell, [Inc.] has really made some great strides in this area. Unisys [Corp.] is beginning to shake loose a little bit. I would say the vendors we've participated with the strongest are DEC and HP.

You've said Ethernet is not well-suited for MAP.

I know that 802.4 will meet all my needs for communications with real-time devices. In some instances, 802.3 will — but not in every instance.

We've got to get the plant floor people sophisticated enough so that they know under which conditions and circumstances they should select 802.3 as the bottom layers and when to select 802.4.

If we deviate now, we're going

Continued on page 42

The CP2000
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Best Route Optimization	Operator-selected	Operator-selected	Automatic
Dial Back-up	Yes	Yes	Yes
Automatic Alarm Reporting	Yes/Netview P.C. Support*	Yes/Netview P.C. Support*	Yes/Netview P.C. Support*
Reports/Alarms	Pre-defined	User-defined	User-defined
Diagnostics	Command-oriented: —local —remote	Menu-driven: —local —remote —system	Menu-driven: —local —remote —system —circuit
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to have tremendous interoperability problems because you'll have one vendor building 802.3 devices and another with 802.4, and how do you make them talk together? You could do it, but it's not easy.

We expect DEC to come along with the customers. I think DEC is convinced this is the way it's going, and they're going to build the products. It remains to be seen how they're going to sell 802.4 compared to how they sell their 802.3 products.

I think we're all right now with DEC. We do listen to Ken Olsen. He's much more technically capable than I am. I think he's motivated by some dollars he could make. They're a good company, and we're working very hard to make sure our relationships are good. And I think we're being very successful.

> "In the sense that big installations are here, yes, MAP has been unique to [GM]. The perception has been largely GM because we've been so public with it. I think 3.0 will diminish that."

What is used for network management under MAP?

Each device or end node on the network has an 'agent' capability, to collect data in the device. We don't have any specifications at the moment for a manager. Any vendor can come along with a manager, and as long as the manager knows where the data is stored in the devices, it comes up with a report.

Is there still a perception that MAP is unique to GM and that if it wasn't for GM, nobody would be pushing MAP?

In the sense that big installations are here, yes, it has been unique to us. The perception has been largely GM because we've been so public with it. I think 3.0 will diminish that.

There are other big implementations, including many that people don't know about. I know of a large company that's doing four of them right now, and they're not talking about it because it gives them a competitive advantage. It's one of our competitors.

Is the potential competitive advantage going to drive MAP acceptance?

Yes, and I think the government pushing it is going to drive MAP acceptance. Even the vendors that aren't going to participate in the 3.0 event have said that within six to 12 months after the event, they'll have product. They're all going to be there.

> "There are other big [MAP] implementations, including many that people don't know about. I know of a large company that's doing four of them right now . . . It's one of our competitors."

How does it feel to be setting up an entire international communications standard?

If I'm given a lot of credit for this — and I'm not saying I am — it couldn't have happened without the users group. It couldn't have happened without tremendous participation and help from users, the Society of Manufacturing Engineers, the National Bureau of Standards and a lot of vendor participants that have helped us. It's been a huge worldwide team effort.

My bag has always been organizing things — making things happen. I've done this kind of thing before but on a much less important, smaller scale. This has been just a massive thing. And it's been wonderful. ◼

Chuck Boucher, President, General Technology Inc.

"My customers—largely Fortune 500 companies—read *Network World*. Consequently, that's where I want to advertise."

Chuck Boucher is president of General Technology Inc., a company based in Melbourne, Florida. They manufacture Balun concentrators and station units, devices which eliminate the need for expensive coaxial cable—and they design and install network control/management systems.

"My customers—largely Fortune 500 companies—read *Network World*. Consequently, that's where I want to advertise," says Chuck. "When I asked them why they read it, they said that *Network World* is the only publication written for users—an idea that they felt was long overdue. They said that *Network World* gives them the best coverage of network control and management, LANs, communications software and T carriers—all areas of interest to General Technology and our customers," he explains.

General Technology Inc. began advertising in *Network World* in September. "The ad—black-and-white measuring 2 columns by 10 inches—ran once, and the response was overwhelming. There were countless requests for product literature and demos—plus 30 solid sales leads. We even had to pull the ad for two weeks to get caught up," says Chuck. "But we're running again," he adds, "because, based on all the responses, we know *Network World* is talking to the right people."

Each week, over 60,000 purchase-involved subscribers look to *Network World* for decision-making information that can help them—and their companies—stay ahead. And more companies, like General Technology Inc., are finding there's no better place to reach a powerful audience of communications buyers. To join the ever-expanding list of *Network World* advertisers, call your local *Network World* sales office and reserve space for your ad today.

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Special Section: Factory communications

Collisions or token resistance?

BY MARVIN CHARTOFF AND JEFF HORN
Special to Network World

The well-publicized verbal battles between Digital Equipment Corp. President Kenneth Olsen and Mike Kaminski, manager of General Motors Corp.'s Manufacturing Automation Protocol program, center around what network protocols are best suited to support Computer-Integrated Manufacturing (CIM) communications requirements.

> Here's a quick review of basic factory networking choices.

Should factory nets use the well-established Ethernet-based DECnet or the up-and-coming broadband-based MAP? What are the relationships between the MAP, Technical and Office Protocol and the International Standards Organization's (ISO) Open Systems Interconnect (OSI) protocol stacks?

Any manufacturing plant consists of two entities — the factory floor where the product is made and the supporting departments and organizations that deal with related information.

Factory floor networks must of-

Continued on next page

Chartoff is a group manager and Horn is a staff consultant with Network Strategies, Inc., a telecommunications consulting firm in Fairfax, Va.

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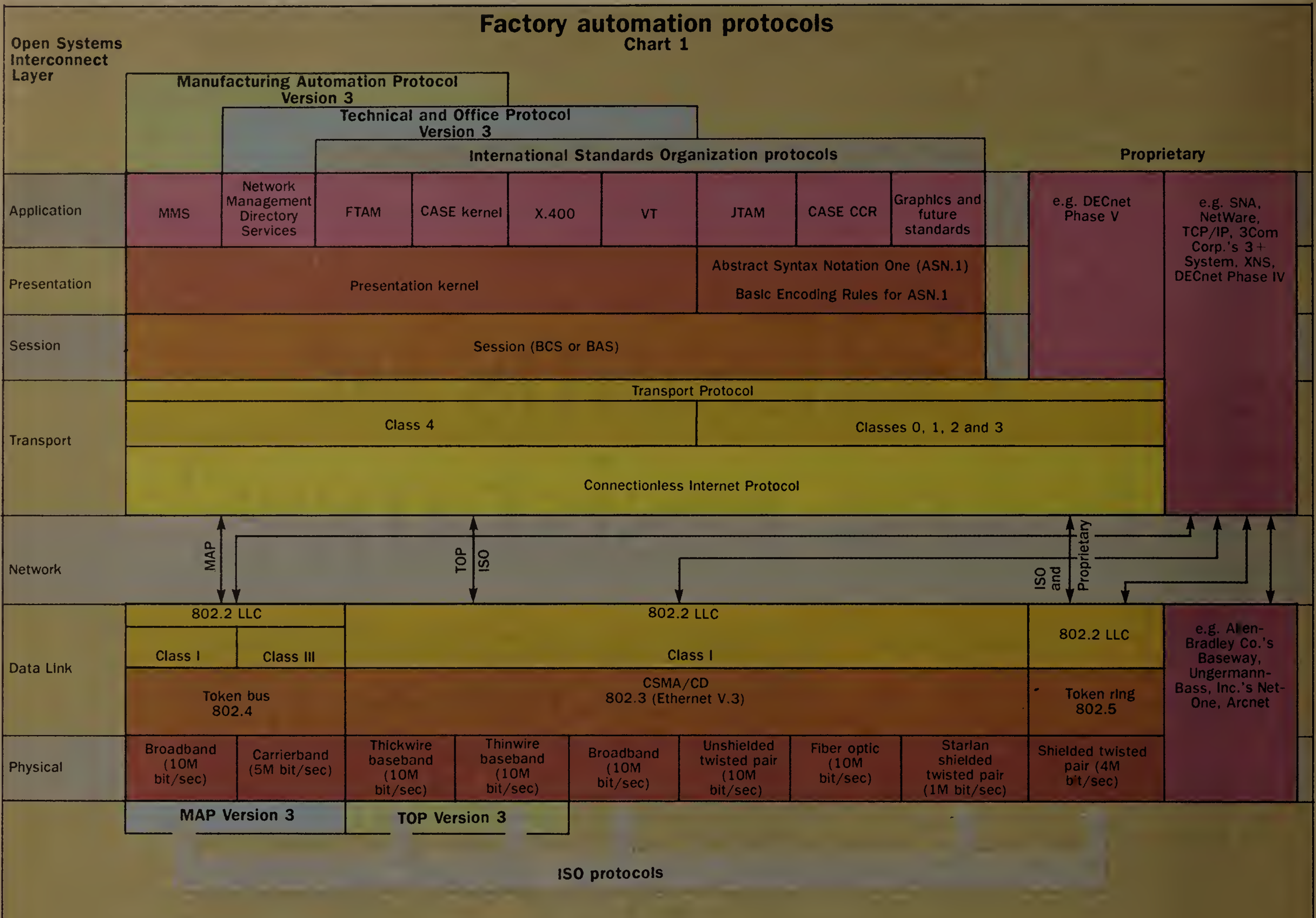

Factory automation protocols
Chart 1

Open Systems Interconnect Layer
Manufacturing Automation Protocol Version 3
Technical and Office Protocol Version 3
International Standards Organization protocols
Proprietary
Application
MMS
Network Management Directory Services
FTAM
CASE kernel
X.400
VT
JTAM
CASE CCR
Graphics and future standards
e.g. DECnet Phase V
e.g. SNA, NetWare, TCP/IP, 3Com Corp.'s 3+ System, XNS, DECnet Phase IV
Presentation
Presentation kernel
Abstract Syntax Notation One (ASN.1)
Basic Encoding Rules for ASN.1
Session
Session (BCS or BAS)
Transport
Transport Protocol
Class 4
Classes 0, 1, 2 and 3
Connectionless Internet Protocol
Network
MAP
TOP
ISO
ISO and Proprietary
Data Link
802.2 LLC
Class I
Class III
Token bus 802.4
CSMA/CD 802.3 (Ethernet V.3)
Token ring 802.5
e.g. Allen-Bradley Co.'s Baseway, Ungermann-Bass, Inc.'s Net-One, Arcnet
Physical
Broadband (10M bit/sec)
Carrierband (5M bit/sec)
Thickwire baseband (10M bit/sec)
Thinwire baseband (10M bit/sec)
Unshielded twisted pair (10M bit/sec)
Fiber optic (10M bit/sec)
Starlan shielded twisted pair (1M bit/sec)
Shielded twisted pair (4M bit/sec)
MAP Version 3
TOP Version 3
ISO protocols

BAS = Basic Activity Subset
BCS = Basic Combined Subset
CASE = Common Application Service Element
CCR = Commitment Concurrence and Recovery
CSMA/CD = Carrier-sense multiple access with collision detection
FTAM = File Transfer and Access Method
JTAM = Job Transfer and Manipulation
LLC = Logical link control
MMS = Manufacturing Message Standard
SNA = Systems Network Architecture
TCP/IP = Transmission Control Protocol/Internet Protocol
VT = Virtual terminal
XNS = Xerox Corp.'s Xerox Network Systems

SOURCE: NETWORK STRATEGIES, INC., FAIRFAX, VA.

From previous page

ten support tightly coupled robots, numerically controlled machines and programmable logic controllers. Networks for manufacturing support organizations, however, are based on nonnumerical planning, scheduling, engineering and business information that must be made available to all of the plant's different computer systems.

A factory network architecture is needed to support integration of diverse multivendor systems environments supporting both factory floor operations and manufacturing support functions. No organization has yet developed a single factory communications architecture that meets the needs of all manufacturing environments. As a result, many users have found it necessary to develop their own factory net architectures. Fortunately, most of the components necessary for the creation of such architectures exist today as industry, national and international protocol standards.

These standards include full protocol suites based on the seven-layer OSI reference model, such as MAP, TOP and the Government OSI Profile (GOSIP), as well as lower level protocols for specific local net topologies, such as Ethernet (802.3) and token ring (802.5).

Network planners are concerned with the differences between these protocols and the ways to choose among them; most of the protocols share characteristics and can be combined to form interoperable protocol stacks. The overlapping, jigsaw-puzzle relationships between today's standard factory communications protocols are illustrated in Chart 1 on this page.

Standard differences

Selection of a factory network architecture is not a straightforward process of choosing MAP for the factory floor and TOP or ISO protocols for the support organizations. There is much flexibility in architecture choices.

No organization has yet developed a single factory communications architecture that meets the needs of all manufacturing environments.

■ **MAP.** GM's MAP specifies selected protocols at all seven layers of the OSI reference model and builds on them by specifying options, parameters, classes and other implementation-specific details not covered by ISO standards.

MAP is really a partial subset of ISO protocols fine-tuned for the assembly line and shop floor environments. For example, MAP specifies the use of a broadband cable network based on the IEEE 802.4 standard for token-passing Media Access Control. MAP also includes the Manufacturing Message Standard (MMS), an OSI Application Layer protocol for formatting and transmitting commands between controlling programs and machines.

■ **TOP.** Similarly, Boeing Computer Services Co.'s TOP, also based on ISO protocols, is designed for engineering, accounting, marketing and other offices that support manufacturing. TOP includes some ISO Application Layer protocols that are not part of MAP: the X.400 messaging protocol and the Virtual Terminal protocol. These differences exist because electronic mail and terminal-to-host access are expected to be more important in TOP office environments than on the factory floor.

TOP specifies the use of IEEE 802.3 local-area nets, rather than Ethernet Version 2, as the standard local network and backbone protocol for TOP networks, due to two major differences between 802.3 and Ethernet Version 2. One difference is 802.3's inclusion of the Logical Link Control protocol, which is needed to conform to MAP/TOP specifications. Logical Link Control allows users to define various entities to share an Ethernet or token-bus adapter board and also defines interfacing for 802.3, 802.4 and 802.5 networks so that users can build Data Link Layer bridges between each.

The other difference between 802.3 and Ethernet Version 2 is in data framing formats, which can cause devices to misunderstand control messages transmitted over the network. Potential framing incompatibilities can be overcome with the use of adapter boards that can be switched to work under either 802.3 or Ethernet Version 2.

■ **ISO.** ISO standards include most

Continued on page 46

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NETWORK WORLD

Gary J. Beach
Publisher

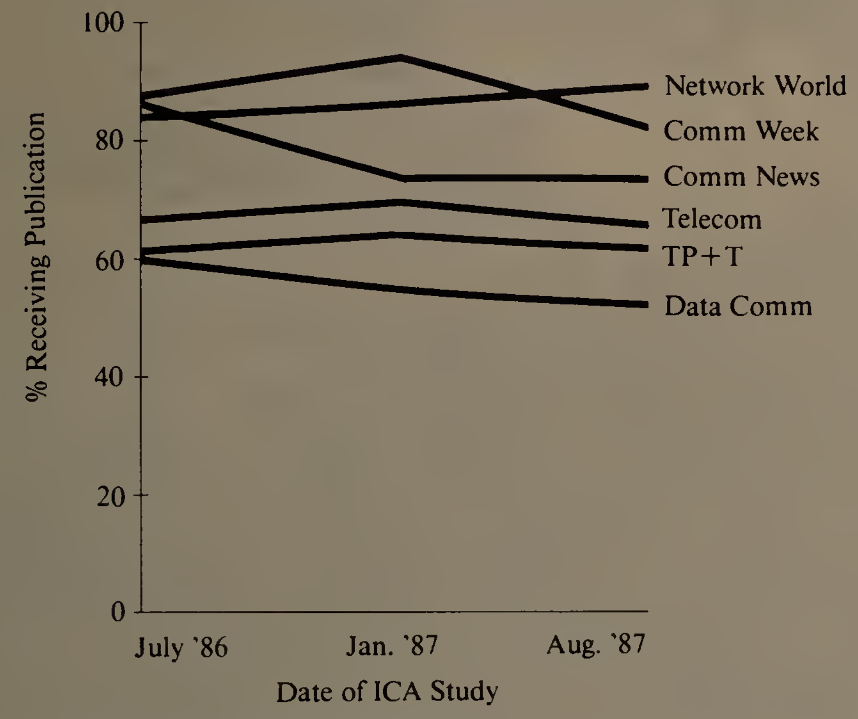
"Rome wasn't built in a day." Although you've heard this saying time and time again, the philosophy behind it — that through hard work you can make things better day by day, week by week, and year by year — remains sound.

It's this very philosophy that *Network World* editors have followed during the past 18 months. And in doing so, they have remained true to their initial goal: to make each issue of *Network World* the best possible for you, our readers.

Evidence is growing that *Network World's* long-term commitment to editorial excellence is paying off. In fact, the latest study conducted by an independent research firm among ICA members shows rather impressive results. Not only does *Network World* top the list of communications-oriented publications in receivership, but it now ranks number one in readership as well.

As you can see in the following charts, both receivership and readership of *Network World* among ICA members have steadily increased since July 1986. However, during this time period, these same ratings have declined for almost every other communications-oriented publication.

Total Receivership of Communications-oriented Publications among ICA Members



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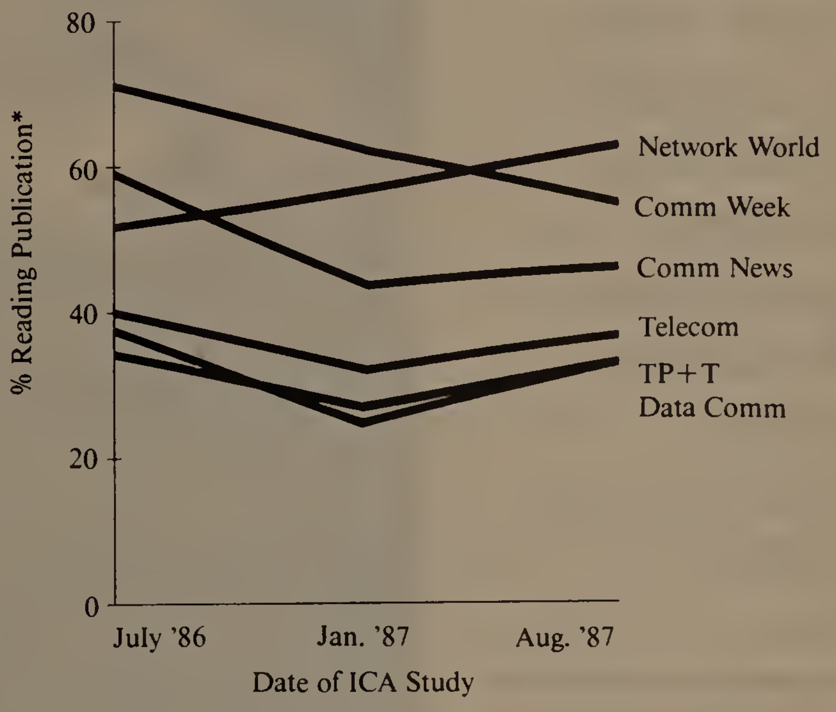

* Readership figure for each publication is based on the number of ICA members who receive that publication.
Studies conducted by First Market Research of Boston.

There's no question about it. *Network World's* in-depth networking coverage is what enables us to deliver a unique editorial product that progressive communications users have come to rely on week after week.

Thanks to the growing support of ICA members and continued dedication of all our readers, *Network World* is now the number one communications-oriented publication for today's leading-edge users.

Cordially,

Gary J. Beach

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of the MAP and TOP protocols plus others not included in either MAP or TOP (see Chart 1 on page 44). Job Transfer and Manipulation is a future ISO protocol whose role in MAP and TOP is undefined. It will be most applicable in factory environments in which job information needs to be routed from one level of processing to another.

- **GOSIP.** This protocol was developed by the U.S. Government OSI Users Committee. Designed to be consistent with and complementary to MAP and TOP, GOSIP mandates federal use of interoperable protocols at all seven layers of the OSI reference model. Initial Application Layer protocols to be supported by the government are the File Transfer and Access Method (FTAM) and X.400, both of which are already included in most existing MAP and TOP product implementations.
- **Proprietary.** These protocols, which are now in factory use, will continue to be used in the near future, especially in networks such as Allen-Bradley Co.'s Data Highway, used to handle the communications requirements for specialized factory machinery. Such architectures represent an installed base that is critically important to existing production facilities.

The protocols of the MAP, TOP, GOSIP and ISO standards are really very similar; at the middle layers (Layers 3 through 6), they are almost identical.

Some of their proprietary protocols can support interfaces to the lower 802.X standards, use the MAP, TOP and ISO transport networks (such as DECnet Phase V's use of the ISO Transport Protocol), or use gateways to provide protocol conversion from proprietary to standard protocols. Eventually, as these proprietary networks are restructured over the years, they will be brought into compliance with industrywide standards.

The protocols of the MAP, TOP, GOSIP and ISO standards are really very similar; at the middle layers (Layers 3 through 6), they are almost identical. Their major differences are at the Application Layer and the local network protocol layers (1 and 2). The abundance of protocols at the Application Layer is due to the variety of applications supported. But for many particular applications, MAP, TOP, GOSIP and ISO use the same protocol, for example, FTAM in the case of file transfer. The use of common upper layer protocols will allow most MAP, TOP, GOSIP and ISO implementations to interoperate with little adjustment.

CSMA/CD is currently supported by more vendors than the token-passing [local-area networking] protocols.

Local net protocol trade-offs

The local-area networking protocol layers (see Chart 2 on page 48) can be grouped into three categories: carrier-sense multiple access with collision detection (Ethernet), token bus and token ring. Each type has advantages and disadvantages for use on the factory floor and in office environments.

- **CSMA/CD.** This alternative is currently supported by more vendors than the token-passing protocols, and it allows use of a greater variety of transmission media. However, it has definite limitations. A single CSMA/CD trunk cannot cover as large an area as a token-bus network. Also, network efficiency suffers under heavy, continuous traffic. Therefore, real-time manufacturing applications should be used only on lightly loaded CSMA/CD nets. Low-volume, distributed job-shop factories are ideal candidates for CSMA/CD nonbroadband backbones.
- **Token bus.** This is most useful where there is an existing broadband network in place, where distances, noise levels and real-time requirements are significant and where network applications are so varied as to require multiple, sepa-

When connecting different communications systems, it's best to put all your eggs in one basket.

rate bandwidth channels. An example is a large assembly line with high-bandwidth computer networks, voice communications and real-time information moving from end to end, while the manufacturing process is controlled over the same line. Currently, vendor token-bus support is more limited than CSMA/CD support.

■ **Token ring.** This is most appropriate for local nets serving fewer than 50 nodes. The star-wiring, acknowledgment and active hub monitoring of token-ring nets increase their reliability over CSMA/CD and token-bus networks. Few vendors provide token-ring adapters for factory floor devices, but offerings should increase due to token ring's usefulness in work cell communications and office applications. Token ring's use as an office backbone is severely limited by station, distance and wiring constraints, but this will change as an industry standard for fiber-optic token-passing rings is implemented.

While baseband is easier to install, broadband allows simultaneous support of multiple networks.

Topological optimization

While baseband is easier to install and maintain, broadband allows simultaneous support of multiple networks, as well as voice and video over the same coaxial cable.

Broadband modems are typically more expensive than baseband transceivers, but the radio frequency transmission of broadband is less susceptible to the electromagnetic interference (EMI) typically found on the factory floor.

The contention-based CSMA/CD is simpler to implement than the token-passing access method, but it does not provide the deterministic access times required in many machine control applications. Token-passing allows users to determine the exact time intervals between messages on the network. CSMA/CD cannot.

CSMA/CD requires less overhead in lightly loaded conditions, since token-passing requires each node to hold the token, even if it has no traffic to transmit. Token passing does support priority traffic, so urgent messages can be given precedence.

The distinctions between topologies have lessened since advances in wiring schemes have made it possible to have logical star, bus and ring topologies physically star-wired to a wiring closet. However, the risk of a single point of failure, inherent in the ring topology, forces a more complex implementation to overcome potential unreliability than in the other two topologies.

The implementation of Ethernet on broadband cable is a straightforward operation that combines some of the advantages of Ethernet with some of the advantages (and headaches) of broadband. By simply exchanging the thick-wire Ethernet transceiver for an Ethernet broadband modem, users can retain the existing Ethernet adapters already installed in devices such as computers, bridges, repeaters and gateways.

CSMA/CD requires less overhead in lightly loaded conditions, since token-passing requires each node to hold the token, even if it has no traffic to transmit.

The resulting network has all the advantages of broadband networks, such as multiple channels and greater resistance to noise than baseband. It also has the broadband disadvantages, such as high maintenance requirements and the need for amplifiers and fairly expensive interfaces. Also, because the access method is still CSMA/CD, the 2½-km distance limitation and nondeterministic access applies to the broadband Ethernet as well.

Users may find broadband Ethernet ideal for providing an interim ISO local net on their broadband

Continued on next page

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From previous page

while waiting for vendors to offer MAP token-bus interfaces. Ethernet and token-bus networks can both be implemented on the same broadband, with a bridge or router providing internetworking and channel-to-channel translation.

The different transmission media — thick-wire Ethernet coaxial cable, thin-wire Ethernet coaxial cable, cable television broadband coaxial cable, nonshielded twisted pair and fiber optics — carry with them varied costs, data rate support, ease of installation, number of devices supported and distance limitations. Fiber optics is the best choice in a high EMI environment, such as a factory. Fiber supports high data rates (more than 100M bit/sec), but fiber taps are very expensive.

Coaxial cable provides high throughput, spans greater distances than twisted pair and can support multiple networks when used with broadband signaling. Nonshielded twisted pair, already in place in many office environments, typically has severe distance limitations and is sensitive to EMI in factory floor environments.

Transmission speeds supported range from 1M to 10M bit/sec for twisted pair, from 5M to 20M bit/sec for coaxial cable, and from 100M to 200M bit/sec for fiber-optics. High speeds are possible on twisted pair but only for a limited distance. Transmission speed is less important than effective throughput, which depends more on the Media Access Control protocol employed than on the transmission speed.

A factory's network topology has a major impact on the local network selection process. Are machines and robots communicating among themselves or with central planning and scheduling data base computers? Are engineering workstations located in a separate office area or down on the shop floor? Will application software be developed on the production network or, more likely, on a separate development network? The answers to these and other questions like them will determine the need for backbones, bridges and gateways to interconnect different local networks and local net technologies in the plant.

In addition to differences between plant floors and office systems, there are various manufacturing environments that require different network topologies. Integrated production lines with real-time communications, such as automated vehicle assembly lines, require a high-speed trunk network supporting many different types of process-to-process communications. Well-defined work areas or manufacturing cells with smaller subnetworks require a gateway or bridge connection to the trunk network. Factory floor computers must feed data back to corporate data bases on a corporate network located in a different building.

In a more loosely connected job-shop environment, the primary networks may be individual local-area networks, rather than a trunk network. To handle the less frequent inter-local net communications, a backbone local network would be useful. If the work areas are widely dispersed, the backbone needs to be a campus, metropolitan area or wide-area network. If there are many levels in the organization's operational hierarchy or geographic distribution, a series of hierarchically organized backbones would be implemented.

In such hierarchies, local backbones interconnect local networks within a department or shop. A main backbone interconnects the local backbones.

Options are available to support varied manufacturers' needs. Plantwide backbones can be made of 802.4 or 802.3 broadband networks, or manufacturing cell subnetworks could be linked to 802.3 or 802.5 baseband hub networks over point-to-point connections. Work-area networks can be 802.3 or 802.5 local nets or 802.4 carrierband segments.

Tomorrow's topologies

Factory communications involves more than wiring robots and process controllers in isolated islands of work. MAP may be excellent for the big assembly lines of the future, but job-shop users will need architectures geared for their environments, which can accommodate a smooth migration path for the proprietary protocols that are currently being used in their plants.

These architectures should be built from standard, interoperable protocols, such as those specified in MAP, TOP, GOSIP and ISO. The commonality of the middle layers of MAP, TOP and ISO means that this decision for the long-term architecture is straightforward. However, factory network architects must choose the Application Layer protocols that they will require in their end systems. The MMS protocol is not needed in the office network; FTAM will generally not be used by robot controllers.

In the meantime, designers must decide whether to use 802.3, 802.4 or 802.5 networks for all or only certain kinds of subnetworks. They must also determine what medium to use in each environment, what kind of backbone network or networks will interconnect their subnets, and where bridges, routers and full gateways should be used. Finally, like all large data communications users, factory network architects must draft a migration plan for current short-term and long-term development of their networks.

Factory network architecture lower layer protocol alternatives
Chart 2

Local-area network protocol / Category	Ethernet IEEE 802.3		Token bus IEEE 802.4		Token ring IEEE 802.5
Signaling technique	Baseband	Broadband	Broadband	Carrierband	Baseband
Media access control	Carrier-sense multiple access with collision detection	Carrier-sense multiple access with collision detection	Token passing	Token passing	Token passing
Topology	Bus	Bus	Bus	Bus	Ring
Transmission medium	Thickwire, thinwire, unshielded twisted pair	Cable television coaxial cable	Cable television coaxial cable	Coaxial cable	Shielded twisted pair
Transmission speed	1M to 10M bit/sec	10M bit/sec	10M bit/sec	5M bit/sec	4M bit/sec

SOURCE: NETWORK STRATEGIES, INC., FAIRFAX, VA.

Letters:

Editor:

In your article on mobile data systems ("How ya gonna call?" *NW*, Oct. 26), the author neglected to mention two interesting automatic vehicle location (AVL) systems.

In the UK, British Telecommunications plc has developed an AVL system that consists of a series of very low-powered superhigh-frequency transmitters that constantly broadcast their identity. The transmitters are mounted on utility poles every 100 meters along a roadway.

The passing vehicle receives the identity code of the nearest transmitter, appends its own vehicle identity, then uplinks this to the dispatch center. It's then possible to analyze the data and produce a moving-target display of a vehicle in transit.

Here in the U.S., entrepreneurs are working on ways to use loran (a long-range aircraft and ship navigation system) as the "reference grid," taking its positional outputs and linking them to a dispatch center.

Loran-C can be surprisingly accurate, even well inland. It can suffer sudden and short extreme errors due to signal dropouts and noise in urban locations, but a bit of rather simple "message sample and hold" comparison processing can toss out the bad readings and analyze the remainder adequately for the vehicle tracking job.

When satellite methods are available and the cost of satellite receivers comes down as a result of volume manufacture, there will be reason to look hard at them. But to obtain the benefits of AVL sooner, it's necessary to develop some interface standards between receivers and data links so users can have a modular choice of navigational information.

The marine industry has a couple of such standards, now used to connect chart recorders and displays to loran receivers. These are called NMEA 0180 and 0183 and are widely used in both loran-C and the current marine satellite positioning receivers. I think we should be using them, connected via whatever interfacing units we need to the mobile data links.

Beyond AVL, there's automatic vehicle monitoring, which is particularly useful for mass transit. A bus could report a drop in engine oil pressure to its maintenance center even before the driver notices the gauge dropping. We have the tools in hand to do this already; it's just a matter of implementing them.

It's also easy to see airlines benefiting from satellite-based AVL, which should give them the accuracy to completely convert the entire air traffic system from ground-based radar to vehicle-initiated reports.

Donald E. Kimberlin
Principal consultant
Mordon Services
Safety Harbor, Fla.

Editor's note:

The author had included much information on AVL systems, notably loran-C, which was omitted from the published article due to space considerations.

Editor:

Your article entitled "Charge of the packet brigade" (*NW*, Sept. 14) was a very informative piece on packet-switch capabilities. We regret that Aydin Monitor Systems was not included on your vendor list.

Our 4000 series products blend packet-switch and packet assembler/disassembler capabilities and provide standard interfaces between nonstandard devices. We are under a production contract to build 500 AMS Model 4200 units for integration into the Defense Data Network worldwide.

Ann Malickson
Sales administrator
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Letters may be edited for space and clarity.

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NETWORK WORLD

A number of Management Updates, Data Comm Buyer's Guides, Telecom Buyer's Guides, PC Buyer's Guides and Industry Focuses are scheduled to run in **NETWORK WORLD** during 1988. Each of these features will focus on one aspect of the networking and communications industry and give our advertisers a chance to reach a more select audience. These are some of the topics the features will cover:

Management Updates:

- January 4 - Negotiating with Vendors (Early close due to Holiday)
- February 1 - Developing Your Management Style

Data Comm Buyer's Guides:

- January 11 - T-1 Multiplexers (Early close due to Holiday)
- February 8 - Modems (below 9600 bps)

Telecom Buyer's Guides:

- January 18 - DSU/CSUs (Early close due to Holiday)
- February 15 - Digital PBXs (above 300 lines)

PC Buyer's Guides:

- January 25 - Microcomputer Communications Software
- February 22 - Ethernet LANS

Industry Focuses:

- February 29 - Government

Editorial Show Coverage:

- January 18 - CN Preview Issue (Early close due to Holiday)
- January 25 - Communication Networks (CN) Show Issue (Bonus Show Distribution)
- February 1 - CN Wrap-Up Issue
- March 21 - Interface Preview Issue

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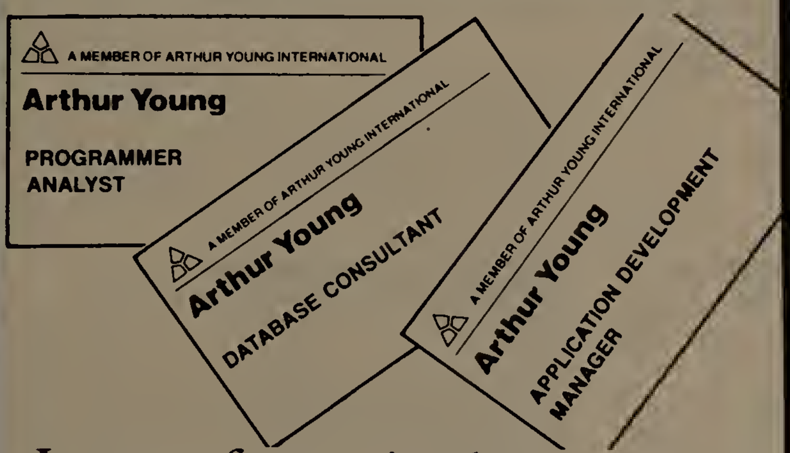
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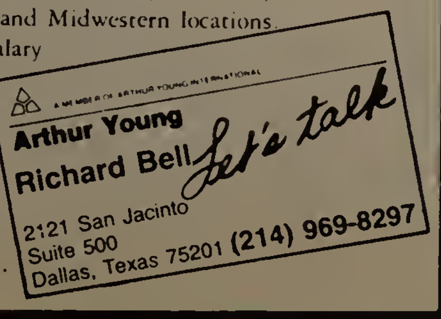
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Unisys acquires Timeplex

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to add a private branch exchange to its product line. Unisys also has a deal with Paradyne Corp. to resell its line of modems and a $50 million OEM deal with Doelz Networks, Inc., another multiplexer maker.

As part of the acquisition, Timeplex Chairman and Chief Executive Officer Edward Botwinick will become senior vice-president of Unisys and president of a new division, Unisys Networks. He will report directly to W. Michael Blumenthal, chairman and chief executive officer of Unisys.

Although the deal must be approved by Timeplex stockholders, who will vote next month, analysts said they expect it to go through because stockholders will receive more than the current book value of the company.

Both companies will continue to operate autonomously in the short term. Eventually, however, the two plan to develop new communications products and bring all Unisys equipment under the aegis of the Unisys Network Management System (UNMS), designed to compete with IBM's NetView and AT&T's Unified Network Management Architecture. UNMS will be based on Timeplex's current network management product, Unified Network Management System.

The acquisition caught analysts by surprise. "Once IBM inked a deal with [T-1 multiplexer maker] Network Equipment Technologies, [Inc.], we expected a lot of other companies to sign alliances," said Larry Cynar, an industry analyst at Dataquest, Inc., a market research firm in San Jose, Calif. "But we didn't expect Unisys to move so quickly."

The deal transforms Unisys from a laggard to a top competitor in the connectivity game. "If Digital Equipment Corp., Hewlett-Packard and Wang didn't feel behind the eight ball when IBM and NET inked a deal, they certainly know they are behind it now," said Steven Levy, an analyst with investment firm Hambrecht & Quist, Inc. in San Francisco.

Analysts were also surprised that Timeplex would sell out after establishing itself as the leading vendor in the T-1 multiplexer market, reporting quarter after quarter of impressive financial results. "Timeplex said that, when it reached a point where it couldn't continue growing at a healthy rate, the company would look for an alternative," said Harry Rosenthal, an analyst with Prudential-Bache Securities, Inc. in New York.

"Obviously, the company thinks it can no longer continue its revenue growth," Rosenthal added.

The effects of Black Monday

Timeplex's thinking may have been triggered by the recent stock market turmoil and the uncertainty of the future economy, according to Gerald Mayfield, vice-president at the Stamford, Conn., office of the DMW Group, Inc., a consulting company.

"We are just starting to sort out the effects of Black Monday," he said. Timeplex's stock climbed 1½ points to 28⅜ after the announcement of the deal, close to the 29¾ price it was commanding before Black Monday. Unisys' stock price fell 2½ points to 30⅛.

"Timeplex said a small company cannot compete in the communications business," Rosenthal noted. With a successful company like Timeplex raising the white flag, other vendors may begin to wonder if their pockets are deep enough to play in the rapidly changing and highly competitive communications market.

Analysts said Timeplex will fill the wide-area networking void in Unisys' product line. However, there are a number of obstacles the two companies must overcome to make the deal successful. First, they must determine how to leverage their current strengths. Dataquest's Cynar said most of Timeplex's customers use IBM mainframes, which directly compete with Unisys products. "Will Unisys allow Timeplex to support IBM's NetView and develop tighter links to IBM systems?" he asked.

The acquisition also threatens Unisys' two OEM agreements. Its agreement with Paradyne centered on the development of an integrated network management system, which Unisys may no longer need, according to analysts.

And members of Doelz's board of directors may think differently about Unisys now that it owns Timeplex. Many of them also sit on the board of NET. In January, Doelz was ready to sign a joint marketing deal with StrataCom, Inc., an NET competitor, but board members intervened and forced Doelz to ink a deal with NET instead, according to analysts. It is doubtful Doelz board members will allow the company to work with Timeplex, another NET competitor.

The company acquisition was actually forged by Blumenthal and Botwinick. Both men are headstrong and bucked accepted thinking in building their corporations. As chairman of Burroughs, Blumenthal orchestrated the merger with Sperry, a move many analysts thought would lead to fiscal disaster. Instead, Unisys prospered, and the stock price doubled from the summer of 1986 to 1987.

CALENDAR

Nov. 17-20, Orlando, Fla. — Planning and Managing Corporate Networks. Contact: Ashley Pearce, Gartner Group, Inc., P.O. Box 10212, 56 Top Gallant Road, Stamford, Conn. 06904.

Nov. 24, New York — Packet Switching: An Overview. Contact: Center for Advanced Technology in Telecommunications, 333 Jay St., Room 321, Brooklyn, N.Y. 11201.

Dec. 1-4, Arlington, Va. — The 2nd TCP/IP Interoperability Conference. Contact: Advanced Computing Environments, 21370 Vai Ave., Cupertino, Calif. 95014.

Dec. 3, Gaithersburg, Md. — Information Resources Management: Standards for Future Information Systems. Contact: Arlene Carlton, National Bureau of Standards, Building 225, Room B151, Gaithersburg, Md. 20899.

Dec. 7-9, Washington, D.C. — The National Connectivity Symposium on Local-Area Networks & Micro-Mainframe Links. Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Dec. 7-10, San Francisco — Experts on Networks. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Dec. 8-9, New York — Systems Network Architecture. Also, March 1-2, New York; March 28-29, Boston. Contact: New York University, School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

Dec. 9, Newton, Mass. — NetWare Users Group. Contact: Glen Fund, 26 Lothrop Rd., Acton, Mass. 01720.

Dec. 9-10, Washington, D.C. — Central Office Switching: New Technologies and Network Applications. Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Dec. 9-10, New York — ISDN Applications and Market Forecasts. Contact: Mark N. Ricca, The Eastern Management Group, 4 Century Drive, Parsippany, N.J. 07054.

Dec. 9-11, New York — Digital PBX: Selection and Implementation. Contact: New York University, School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

Jan. 25-28, Washington, D.C. — Communications Networks. Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

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Utility focuses network control

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and 200,000 miles of dedicated data lines.

Richard A. Johnson, manager of the telecommunications department at PG&E, said the network is the largest private network operated by a utility in the U.S.

The network, which was constructed along rights-of-way used for gas and electric lines, supports data communications between branch offices and IBM mainframe computers in the utility's central site in a downtown San Francisco office complex. It also ties the 145 private branch exchanges used throughout the company to support the voice needs of 28,000 employees.

The network supports a variety of applications running on IBM mainframes that monitor power stations and act as giant circuit breakers, controlling the flow of electricity to accommodate changing conditions.

The company uses 16 network management systems to manage the various network applications. In the last few years, the size of the utility's network management staff increased to 200. The bulk of the staff is spread throughout the central office complex, but employees are also stationed at remote sites.

After examining its network operation at the beginning of last year, the company discovered it could cut costs and increase network reliability by consolidating network management functions in one control center.

Rather than attempting to integrate all network management functions under a single console, the company planned to automate its network service and maintenance functions.

"We want to put some intelligence in the network, so it can look at information from various subsystems and provide information that helps our operators make correct decisions," said Jim Aigelpinger, director of telecommunications maintenance and operations at PG&E.

The company also wanted to take network management information from all of the 16 network management systems and store it in a central data base. The central data base would enable the company to print service orders and trouble tickets for remote locations.

The consolidation would improve network reliability, which Johnson said already boasts a healthy 99.998% record. "One reason we manage our own network is we are able to provide our users with much better service than if a carrier managed the network," Johnson said.

Reliability would improve because many management functions that are currently entered manually and subject to error would be automated, such as testing or switching out problem lines. Automation would help the company control its personnel costs. "Many of the current functions could be performed by a computer rather than a technician," Johnson said.

Last spring, the company issued a request for quotations for a system to consolidate the 16 systems. "Many of the things we want to implement have not been done by any company yet," Johnson said. "We thought the job would require a vendor with systems integration capabilities."

Not surprisingly, PG&E found that no vendor could furnish all the pieces needed for the project. "Vendors could supply tools that performed specific functions, such as automatic trunk testing, but none had the capability to integrate all the information into one system," Johnson said.

Consequently, the company is doing some of the work itself. Recently, PG&E purchased an IBM mainframe that will be dedicated to managing the network. The company decided to write software to automate certain functions, and two programs have already been written.

In the next few weeks, PG&E plans to issue a request for proposal for the consolidated telecommunications center. The company has taken out a few of the requirements needed to manage the circuit-breaking network from the latest request for quotations.

Vendors will have until the first of next year to answer the request, and PG&E plans to complete most of the center by the end of next year.

GAO assails FCC rules

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been evaluating our resources and requirements for enforcing our nonstructural safeguards," Patrick said.

The FCC is in the process of reorganizing the Accounting and Audits division and is implementing a new computer system to help the department analyze RBHC accounting data, Patrick said.

When these changes are implemented, Patrick told Congress, "we will have more than 30 experienced people involved with oversight of our cost-allocation rules. We believe this is sufficient to ensure our policies are enforced."

Henry Rivera, a communications attorney with Washington, D.C. law firm Dow, Lohnes & Albertson and a former FCC commissioner, said, "The GAO report doesn't seem to say there's a conceptual flaw with the FCC's approach. It said there's a resource problem that could prevent the FCC from doing an adequate job of enforcing the rules. I think the FCC will allocate more resources to the task as a result of the GAO findings."

Brian Moir, Washington counsel for the International Communications Association (ICA), said, "The GAO report was an indictment of the FCC's commitment to making the new accounting rules work." The ICA has long criticized the FCC for failing to enforce existing rules and for failing to acknowledge user concerns.

LAN factions split on OS/2

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operating system.

Microsoft, in conjunction with 3Com Corp., developed the LAN Manager, which consists of software for servers and workstations.

At the recent Comdex/Fall'87 show, IBM announced the LAN Server, which is comparable to the LAN Manager in that both provide file- and printer-sharing services ("IBM details OS/2 net support plans, *NW*, Nov. 9). However, IBM has built the LAN Server on top of its own enhanced version of OS/2 called the OS/2 Extended Edition. The OS/2 Extended Edition contains the networking hooks personal computers need to communicate with the LAN Server, as well as additional communications abilities.

Microsoft promised OS/2 would launch a new generation of local net applications called distributed applications. This claim was based on the premise that OS/2 would run both on network servers and networked workstations, thus allowing applications to be split among servers and workstations.

IBM endorsed this philosophy by using the OS/2 Extended Edition as the basis of its networking scheme. While IBM and Microsoft support many of the same network building blocks, such as Network Basic I/O System, the two companies have different schemes for the process-to-process communications needed to develop distributed applications.

IBM is committed to its Advanced Program-to-Program Communications for interprocess communications. APPC is supported within the OS/2 Extended Edition. Microsoft, by contrast, has implemented a "named pipes" facility in its LAN Manager.

A pipe is a programming facility for establishing a connection, or pipeline, between a computer's memory and a disk drive, screen or keyboard. Named pipes extend this connection across the network, enabling an application running on a server or workstation to pipe data to one or more servers or workstations on a network.

IBM reportedly told attendees at a developers' session at the Comdex show that it is using named pipes for interprocess communications within the LAN Server. However, the company said it would not provide developers with the subroutines or interfaces necessary to access the named pipes facility. As a result, an application that uses named pipes will not run properly on an IBM local network, an IBM spokesman told *Network World.*

IBM uses NETBIOS to communicate between its LAN Server and networked workstations, but the company is pushing APPC because it provides peer-to-peer communications across a variety of computer systems and environments. In addition, APPC is supported within the OS/2 Extended Edition and could be used for interprocess communications on a local network without requiring use of the LAN Server, an IBM spokesman said.

"Our direction is to get to a point where the application program — and, certainly, the users — are not conscious of whether they got the data from a System 370 host, a local host or the file server," said Arthur Dvorak, manager of product operations for the IBM OS/2 Extended Edition.

To this end, IBM has included in the OS/2 Extended Edition both local network support and a communications subsystem called the Communications Manager. This is designed to support connections between IBM's Personal System/2 line and both IBM and non-IBM personal computers and host systems, Dvorak said. The system's key functions are terminal emulation — including IBM 3270 and IBM 5250 — file transfer and network management, Dvorak said.

With the communications capabilities in the OS/2 Extended Edition, IBM is offering personal computer users a range of options. Because APPC is so integral to this scheme, it seems unlikely IBM will provide programmers with support for named pipes, even though it is using this facility within the LAN Server.

Robert Bressler, vice-president and general manager of 3Com's Software Products Division, said, "This scenario is bad for us because it forces the user to choose between the IBM product and 3+open." 3+open, due for release in June 1988, is 3Com's next-generation networking product and is based on Microsoft's OS/2 and LAN Manager. Ideally, 3Com would like its networking product to coexist with IBM's, Bressler said.

One way out of the dilemma would be for Microsoft to provide an extension to OS/2 that would allow developers to tap into the named pipes used in the IBM LAN Server, Bressler said. "If IBM doesn't offer this extension, Microsoft and 3Com will." Microsoft's vice-president of system software, Steve Ballmer, told *Network World* that incorporating named pipes into OS/2 was a long-term goal.

But, according to Scott Haugdahl, senior systems specialist at Architecture Technology Corp. in Minneapolis, developers looking to create distributed applications are going to have to support the OS/2 Extended Edition. "OS/2 Extended Edition supports APPC, and it also provides Enhanced Connectivity Facilities so you can use larger machines as servers."

Developers, including MIS staff, will be able to write an application on a local network using the APPC programming interfaces. That application will be able to access minicomputers and mainframes, and even run on these larger machines, Haugdahl said.

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